



**ANNA UNIVERSITY CHENNAI  
CHENNAI - 600 025**

**UNIVERSITY DEPARTMENTS**

**REGULATIONS 2012**

**CURRICULUM I TO X SEMESTERS**

**B. ARCH DEGREE PROGRAMME  
(FULL TIME)**



**ANNA UNIVERSITY, CHENNAI - 600 025****UNIVERSITY DEPARTMENT****R - 2012****B. ARCH DEGREE PROGRAMME****CURRICULUM I TO X SEMESTERS****SEMESTER I**

<b>Code No</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>C</b>
<b>THEORY</b>					
AR8101	Mathematics	3	0	0	3
AR8102	History of Architecture & Culture I	3	0	0	3
AR8103	Theory of Architecture- I	3	0	0	3
AR8104	Building Materials I	3	0	0	3
<b>STUDIO</b>					
AR8111	Architectural Drawing I	0	0	5	3
AR8112	Art Studio	0	0	5	3
AR8113	Basic Design	0	0	12	6
	Sub Total	12	0	22	24

**SEMESTER II**

<b>Code No</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>C</b>
<b>THEORY</b>					
AR8201	Mechanics of Structures – I	3	0	0	3
AR8202	History of Architecture & Culture II	3	0	0	3
AR8203	Theory of Architecture-II	3	0	0	3
AR8204	Building Materials II	3	0	0	3
<b>STUDIO</b>					
AR8211	Building Construction I	0	0	5	3
AR8212	Architectural Drawing II	0	0	5	3
AR8213	Architectural Design – I	0	0	12	6
	Sub Total	12	0	22	24

**SEMESTER III**

<b>Code No</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>C</b>
<b>THEORY</b>					
AR8301	Mechanics of Structures – II	3	0	0	3
AR8302	History of Architecture & Culture III	3	0	0	3
AR8303	Climate and Built Environment	3	0	0	3
AR8304	Building Materials III	3	0	0	3
<b>THEORY CUM STUDIO</b>					
AR8305	Computer Aided Visualisation	1	0	3	3
<b>STUDIO</b>					
AR8311	Building Construction II	0	0	5	3
AR8312	Architectural Design II	0	0	14	7
	Sub Total	13	0	22	25

**SEMESTER IV**

<b>Code No</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>C</b>
AR8401	Design of Structures – I	3	0	0	3
AR8402	History of Architecture & Culture IV	3	0	0	3
AR8403	Environmental Science	3	0	0	3
AR8404	Building Materials IV	3	0	0	3
<b>THEORY CUM STUDIO</b>					
AR8405	Building Services I	2	0	2	3
<b>STUDIO</b>					
AR8411	Building Construction III	0	0	5	3
AR8412	Architectural Design III	0	0	14	7
	Sub Total	14	0	21	25

### SEMESTER V

Code No	Course Title	L	T	P/S	C
<b>THEORY</b>					
AR8501	Design of Structures II	3	0	0	3
AR8502	History of Architecture & Culture V	3	0	0	3
	Elective – I	3	0	0	3
<b>THEORY CUM STUDIO</b>					
AR8503	Building Services II	2	0	2	3
AR8504	Site Analysis and Planning	2	0	2	3
<b>STUDIO</b>					
AR8511	Building Construction IV	0	0	5	3
AR8512	Architectural Design IV	0	0	14	7
	Sub Total	13	0	23	25

### SEMESTER VI

Code No	Course Title	L	T	P/S	C
<b>THEORY</b>					
AR8601	Design of Structures – III	3	0	0	3
AR8602	History of Architecture & Culture VI	3	0	0	3
	Elective – II	3	0	0	3
	Elective - III	3	0	0	3
<b>THEORY CUM STUDIO</b>					
AR8603	Building Services III	2	0	2	3
<b>STUDIO</b>					
AR8611	Architectural Design Development	0	0	6	3
AR8612	Architectural Design – V	0	0	14	7
	Sub Total	14	0	22	25

**SEMESTER VII**

Code No	Course Title	L	T	P/S	C
<b>THEORY</b>					
AR8701	Specifications and Estimation	3	0	0	3
AR8702	Human Settlements Planning	3	0	0	3
AR8703	Professional Practice and Ethics	3	0	0	3
	Elective IV	3	0	0	3
	Elective V	3	0	0	3
<b>THEORY CUM STUDIO</b>					
AR8704	Urban Design	2	0	2	3
<b>STUDIO</b>					
AR8711	Architectural Design - VI	0	0	16	8
	Sub Total	17	0	18	26

**SEMESTER VIII**

Code No	Course Title	L	T	P/S	C
	Elective VI	3	0	0	3
AR8811	Thesis	0	0	34	17
	Sub Total	3	0	34	20

**SEMESTER IX**

Code No	Course Title	L	T	P/S	C
AR8911	<u>Practical Training I</u>	x	x	x	10
	Sub Total				10

**SEMESTER X**

Code No	Course Title	L	T	P/S	C
AR8081	<u>Dissertation</u>	x	x	x	3
AR8082	<u>Practical Training II</u>	x	x	x	10
	Sub Total				13

**TOTAL NO OF CREDITS FOR COMPLETION OF DEGREE : 217**

**LIST OF ELECTIVES**

**SEMESTER V & VI**

<b>Sl.No</b>	<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>C</b>
1.	AR8001	Art Appreciation	3	0	0	3
2	AR8002	Earthquake Resistant Architecture	3	0	0	3
3	AR8003	Energy Efficient Architecture	3	0	0	3
4	AR8004	Evolution of human settlements	3	0	0	3
5	AR8005	Interior Design	3	0	0	3
6	AR8006	Structure and Architecture	3	0	0	3
7	AR8007	Theory of Design	3	0	0	3
8	AR8008	Vernacular Architecture	3	0	0	3

**SEMESTER VII AND VIII**

<b>Sl.No</b>	<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>C</b>
9	AR8009	Advanced Structures	3	0	0	3
10	AR8010	Architectural Conservation	3	0	0	3
11	AR8011	Architectural Journalism and Photography	3	0	0	3
12	AR8012	Construction and Project management	3	0	0	3
13	AR8013	Construction Technology	3	0	0	3
14	AR8014	Contemporary Processes in Architecture	3	0	0	3
15	AR8015	Landscape & Ecology	3	0	0	3
16	AR8016	Sustainable Planning and Architecture	3	0	0	3
17	AR8017	Urban Housing	3	0	0	3

**Note :** **L** – Lecture period **T**- Tutorial Period **P**- Practical period / **S** –Studio period  
**C** - Credits

## B.Arch. Degree Programme – Regulations R 2012

### Consolidated statement of Total Credits in each Semester

Semester	L	T	P/S	C
I	12	0	22	24
II	12	0	22	24
III	13	0	22	25
IV	14	0	21	25
V	13	0	23	25
VI	14	0	22	25
VII	17	0	18	26
VIII	3	0	34	20
IX	-	-	-	10
X	-	-	-	13
Total				217



**AIM**

To develop analytic skills needed for problem solving and creative thinking.

**OBJECTIVES**

- Identifying practical problems to obtain solutions involving trigonometric and exponential functions.
- Studying the properties of lines and planes in space, along with sphere and providing a tool to understand 3D material.
- Understand functions of more than one variable, along with differentiation under integral sign.
- Solving differential equation of certain type.
- Analysing data collection and interpretation of results using statistical tools.

**UNIT I TRIGONOMETRY AND MENSURATION 9**

Trigonometric (sine, cosine and tan functions) and exponential functions, De-Moiver's theorem. Area of plane figures, computation of volume of solid figures.

**UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY 9**

Direction cosines and ratio's – Angle between two lines – Equations of a plane – Equations of a straight line – Coplanar lines – Shortest distance between skew lines – Sphere – Tangent plane – Plane section of a sphere.

**UNIT III INTEGRATION AND FUNCTIONS OF TWO VARIABLES 9**

Integration of rational, trigonometric and irrational functions, properties of definite integrals, Reductions formulae for trigonometric functions, Taylor's Theorem - Maxima and Minima (Simple Problems).

**UNIT IV ORDINARY DIFFERENTIAL EQUATIONS 9**

Linear equations of second order with constant coefficients – Simultaneous first order linear equations with constant coefficients – Homogeneous equation of Euler type – Equations reducible to homogeneous form.

## **UNIT V BASIC STATISTICS AND PROBABILITY**

**9**

The arithmetic mean, median, mode, standard deviation and variance - Regression and correlation - Elementary probability - Laws of addition and multiplication of probabilities - Conditional probability – Independent events.

**TOTAL: 45 PERIODS**

### **TEXT BOOK:**

1. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 41st Edition, 2011.

### **REFERENCES:**

1. Bali N., Goyal M. and Watkins C., “Advanced Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2009.
2. Ramana B.V., “Higher Engineering Mathematics”, Tata McGraw Hill Co. Ltd., New Delhi, 11th Reprint, 2010.
3. Greenberg M.D., “Advanced Engineering Mathematics”, Pearson Education, New Delhi, 2nd Edition, 5th Reprint, 2009.
4. Gupta S.C and Kapoor V.K., “ Fundamentals of Mathematical Statistics”, Sultan Chand & Sons, New Delhi, 9th Edition, 1996.

**AR8102**

**HISTORY OF ARCHITECTURE AND CULTURE**

**L T P/S C**

**3 0 0 3**

### **AIM :**

To inform about the development of architecture in the Ancient Western World and the cultural and contextual determinants that produced that architecture.

### **OBJECTIVES :**

- To understand architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate.
- To gain knowledge of the development of architectural form with reference to Technology, Style and Character in the prehistoric world and in Ancient Egypt, West Asia, Greece and Rome.

## **CONTENT:**

### **UNIT I      PREHISTORIC AGE      6**

Introducing concepts of culture and civilization – Paleolithic and Neolithic Culture – art forms and evolution of shelter – megaliths – agricultural revolution and its impact on culture and civilization.

### **UNIT II      ANCIENT RIVER VALLEY CIVILIZATIONS: EGYPT      7**

Landscape and culture of Ancient Egypt – history – religious and funerary beliefs and practices – monumentality – tomb architecture: evolution of the pyramid from the mastaba – temple architecture: mortuary temples and cult temples

Great Pyramid of Cheops, Gizeh – Temple of Ammon Ra, Karnak – Temple of Abu Simbel (Rock Cut)

### **UNIT III      ANCIENT RIVER VALLEY CIVILIZATIONS: MESOPOTAMIA      8**

Urbanization in the Fertile Crescent – Sumerian, Babylonian, Assyrian and Persian culture – evolution of city-states and their character – law and writing – theocracy and architecture – evolution of the ziggurat – palaces.

Ziggurat of Ur, Urnamu – Palace of Sargon, Khorsabad – Palace at Persepolis

### **UNIT IV      CLASSICAL PERIOD: GREECE      12**

Landscape and culture of Greece – Minoan and Mycenaean cultures – Hellenic and Hellenistic cultures – Greek character – Greek polis and democracy – Greek city planning – architecture in the archaic and classic periods – Domestic architecture; Public Buildings: Agora, stoas, theaters, bouletrion and stadias – Greek temple: evolution and classification – Parthenon and Erektion – orders in architecture: Doric, Ionic, Corinthian – optical illusions in architecture.

### **UNIT V      CLASSICAL PERIOD: ROME      12**

Roman history: Republic and Empire – Roman religion and the Roman temple – Roman character – lifestyle – Roman urban planning – art and architecture as imperial propaganda: forums and basilicas – domestic architecture – structural forms, materials and techniques of construction – orders in architecture: Tuscan and Composite.

Rome: Forum Romanum and other Imperial Forums, Enclosure and manipulation of space: Pantheon – Public buildings: Colloseum, Circus Maximus, Thermae of Caraculla.

**TOTAL : 45 PERIODS**

## **REQUIRED READINGS:**

1. Sir Banister Fletcher, A History of Architecture, CBS Publications (Indian Edition), 1999.
2. Spiro Kostof – A History of Architecture – Setting and Rituals, Oxford University Press, London, 1985.
3. Leland M Roth; Understanding Architecture: Its elements, history and meaning; Craftsman House; 1994.

## **REFERENCES:**

1. Pier Luigi Nervi, General Editor – History of World Architecture – Series, Harry N. Abrams, Inc. Pub., New York, 1972.
2. S. Lloyd and H.W. Muller, History of World Architecture – Series, Faber and Faber Ltd., London, 1986.
3. Gosta, E. Samdstrp, Man the Builder, Mc.Graw Hill Book Company, New York, 1970.
4. Webb and Schaeffer; Western Civilisation Volume I; VNR: NY: 1962.
5. Vincent Scully: Architecture; Architecture – The Natural and the Man Made : Harper Collins Pub: 1991.

**AR8103**

**THEORY OF ARCHITECTURE I**

**L T P/S C**

**3 0 0 3**

## **AIM :**

The course is devised to introduce architecture as a discipline and to enable understanding of the experiential aspects of built form and space.

## **OBJECTIVES :**

- To introduce the various facets of architecture and its influencing factors.
- To introduce the formal vocabulary of architecture as one of the ways to experience the built environment.
- To understand and appreciate the universals of architectural form and space in terms of elements and principles within particular historical, cultural and geographic contexts.

## **UNIT I INTRODUCTION TO ARCHITECTURE**

**8**

Definitions of Architecture – Origin of Architecture – architecture as a discipline – context for architecture as satisfying human needs: functional, aesthetic and psychological-outline of components and aspects of architectural form-site, structure, skin, materials, services, use, circulation, expression, character, experience – Introduction to the formal vocabulary of architecture and Gestalt ideas of visual perception.

**UNIT II      ELEMENTS OF ARCHITECTURE****7**

Understanding fundamental elements such as point, line, plane, form and space, shape, pattern, light, colour, surface and texture with reference to the evolution of architectural form and space.

**UNIT III      ELEMENTS OF ARCHITECTURE – FORM****9**

Understanding perceptual effects of specific geometric forms such as sphere, cube, pyramid, cylinder and cone and its sections as well as their derivatives with respect to the evolution of architectural form and space.

**UNIT IV      ELEMENTS OF ARCHITECTURE – SPACE****9**

Understanding perceptual effects of specific configuration of architectural spaces – Enclosure – Internal and External, Continuous spaces – Spatial relationship and its types, Spatial organisation: Centralized, Linear, Radial Clustered, Grid – built form and open space relationships.

**UNIT V      PRINCIPLES OF ARCHITECTURE****12**

Understanding fundamental principles such as proportion, scale, balance, symmetry/asymmetry, rhythm, axis, hierarchy, datum, unity, harmony, dominance, climax – Movement with reference to the architectural form and space – detailed study of relationship between architectural form and circulation – Types of circulation – Building approach and entrance, path configuration and form, path space relationship, orientation.

**TOTAL : 45 PERIODS****REQUIRED READINGS:**

1. Francis D.K. Ching, Architecture-Form, Space and Order, Van Nostrand Reinhold Company, New York, 2007.
2. Simon Unwin, Analysing Architecture, Routedge, London, 2003.
3. V.S. Pramara, Design Fundamentals in Architecture, Somaiya Publications Private Ltd., New Delhi, 1973.
4. Yatin Pandya, Elements of Space making, Mapin 2007.

**REFERENCES:**

1. Leland M.Roth – Understanding Architecture, its experience history and meaning, Craftsman house, 1994.
2. Peter von Meiss – Elements of architecture – from form to place, Spon Press 1977.

3. Rudolf Arnheim – The dynamics of architectural form, University of California Press 1977.
4. Neils Prak, Mounton & Co. The language of Architecture 1968.
5. Paul Alan Johnson – The Theory of Architecture – Concepts and themes, Van Nostrand Reinhold Co., New York, 1994.

**AR8104**

**BUILDING MATERIALS I**

**L T P/S C**

**3 0 0 3**

**AIM:**

This course is devised to make students understand the basic materials of construction such as soil, lime, stone and rocks and other naturally occurring materials such as bamboo, palm, straw, etc.

**OBJECTIVES:**

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as soil, lime, rocks and stones.
- To inform the properties, characteristics and use of bamboo, palm, straw, etc. and methods of preservation and treatment.
- To sensitize the students to the use of these naturally occurring materials in the context of creating a green architecture.

**CONTENT:**

**UNIT I SOILS 9**

Fundamentals of Soil Science, Types of soils, Principles of Soil Stabilization, Characteristics of core, Types of Stabilizers, Requirements and Types of mudwall building and surface protection.

**UNIT II LIME 8**

Types of lime, Classification of lime, comparison between fat lime and hydraulic lime, Manufacturing process slaking, Hardening – Testing and Storage, Lime putty, Precautions in handling and uses of lime.

**UNIT III BAMBOO AND OTHER MATERIALS 10**

Bamboo – Bamboo as plant classification, species, geographical distribution, Anatomy of Bamboo, Properties, strength, processing, harvesting, working of Bamboo tools – Treatment

and preservation of Bamboo and uses of Bamboo. Cane, gate, coir, coconut - Growth, Form, Shape, Leaves, Flowering, Propagation Roofing materials – Thatch, grass, Bamboo, reeds – Basics – Case studies and applications.

#### **UNIT IV STRAW BALES**

**6**

Straw as a building material-physical aspects - Basics, Fire, moisture, insects and pests proof. Plastering straw bale walls, straw bale roof.

#### **UNIT V ROCKS AND STONES**

**12**

Classification of rocks, Sources, Seasoning, Quarrying of stones, Dressing, Characteristics of stones, Testing of stones, Common building stones and their uses. Masonary and paving. Stone veneering, preservation of stones Deterioration of stones, Durability, Preservation, Selection of stones, Artificial stones.

**TOTAL: 45 PERIODS**

#### **REQUIRED READINGS:**

1. P.C. Varghese, Building Materials, Prentice Hall of India put Ltd New Delhi 110001, 2005.
2. Dunkelberg (K), Bambus – Bamboo, Bamboo as a Building Material, Karl Kramer Verlag Stuttgart, 2000.
3. Building with straw - Design and Technology of a Sustainable Architecture Gernot Minke and Friedemann Mahlke Birkhauser – Publisher for Architecture Berlin – Bostan, 2005.

#### **REFERENCES:**

1. S.K. Duggal, Building materials, Oxford and IBH publishing Co, put, Ltd, New Delhi 110001, 1997.
2. R. F. Spencke and D.J.Cook. Building Materials in Developing Countries – John Wiley and sons 1983.

**AR8111**

**ARCHITECTURAL DRAWING I**

**L T P/S C**

**0 0 5 3**

#### **AIM**

To introduce the concepts and fundamentals of architectural drawing, to develop representation skills and to nurture the understanding of the nature of geometrical forms and simple building forms and to teach the language of architectural and building representation in two- and three-dimensions; To introduce the basics of measured drawing.

<b>UNIT I</b>	<b>GEOMETRICAL DRAWING: INTRODUCTION</b>	<b>15</b>
Introduction to fundamentals of drawing/ drafting: Construction of lines, line value, line types, lettering, dimensioning, representation, format for presentation, etc.; Construction of angles, use of scales; Construction of circles, tangents, curves and conic sections.		
<b>UNIT II</b>	<b>GEOMETRICAL DRAWING: PLANE GEOMETRY</b>	<b>20</b>
Construction and development of planar surface – square, rectangle, polygon etc Introduction of multi- view projection – projection of points, lines and planes.		
<b>UNIT III</b>	<b>GEOMETRICAL DRAWING: SOLID GEOMETRY</b>	<b>10</b>
Multi- view projection of solids – cube, prism, pyramids, cones, cylinders etc.; Sections of solids, true shape of solids.		
<b>UNIT IV</b>	<b>GEOMETRICAL DRAWING: AXONOMETRIC PROJECTION</b>	<b>10</b>
Isometric, plan oblique and elevation oblique projection of planes, solids and combination of solid etc.		
<b>UNIT V</b>	<b>MEASURED DRAWING</b>	<b>20</b>
Isometric, plan oblique and elevation oblique projection of planes, solids and combination of solid etc.		
<b>TOTAL : 75 PERIODS</b>		

**REQUIRED READINGS**

1. IH. Morris, Geometrical Drawing for Art Students - Orient Longman, Madras, 2004.
2. Francis D. K. Ching, Architectural Graphics, John – Wiley and Sons, 2009.
3. Fraser Reekie, Reekie’s Architectural Drawing, Edward Arnold, 1995

**REFERENCES:**

1. C.Leslie Martin, Architectural Graphics, The Macmillan Company, New York, 1978.

**AR8112**

**ART STUDIO**

**L T P/S C**  
**0 0 5 3**

**AIM:**

To develop presentation skills, visual expression and representation, imaginative thinking and creativity through a hands on working with various mediums and materials.



**OBJECTIVES:**

- To familiarize the students with the various mediums and techniques of art through which artistic expression can be achieved
- To familiarize students with the grammar of art by involving them in a series of free hand exercises both indoor and outdoor to understand form, proportion, scale, etc
- Involving them in a series of exercises which will help them experiment with form and volume.
- To involve students in a series of exercises which will look at graphic and abstract representations of art.

**CONTENT:****UNIT I DRAWING 24**

Introduction to art – Elements and principles of drawing – Types of drawing – Visual effects of drawing – Scale drawing – Composition – Approach to sketching – Study of light, shade and shadow.

Exercise involving Indoor and out door sketching – Spot sketching - Drawing from imagination – Study of 3 D effects through light and shade from nature – Tools and materials – Illustration – Study of human being and mobiles.

**UNIT II PAINTING I 12**

Introduction of painting – Colour – Properties of colour – Colour schemes – Types of colours - Application and visual effects of colour. Exercise involving Study of colour – Properties of paper, brush and other tools – Basic washes – 3D effects from still-life, nature and built environment using mono chromatic and multi colour.

**UNIT III PAINTING II 15**

Indoor and out door painting – Rendering techniques  
Exercise involving Water colour – Water soluble colour pencil – Tempera – Acrylic – Water soluble oil colour – Oil colour – Pen and ink – Brush – Air brush – Mixed mediums – Study of multi colour and 3D effects from nature and built environment.

**UNIT IV SCULPTURE 12**

Introduction of sculpture – Sculpture using various materials such as clay, plaster of Paris, paper mache, and wire.

**UNIT V APPLIED ART 12**

Graphic representations – Visual composition and Abstraction- Exercises involving Logo design, collage, calligraphy and printing.

**TOTAL: 75 PERIODS**

## **REQUIRED READINGS**

1. Webb, Frank, "The Artist guide to Composition", David & Charles, U.K., 1994.
2. Drawing a Creative Process", Ching Francis, Van Nostrand Reinhold, New York, 1990.
3. Alan Swann, Graphic Design School, Harper Collins, 1991.

## **REFERENCES:**

1. Moivahuntly, "The artist drawing book", David & Charles, U.K., 1994.
2. Arundell (Jan) Exploring sculpture, Mills and Boon, London/Charles, T. Brand Ford Company, U.S.A.
3. The art of drawing trees, heads, colours, mixing, drawing, landscape and painting, water colour, oil colour, etc. – The Grumbacher Library Books, New York –1996.
4. Caldwell Peter, "Pen and Ink Sketching", B.T. Bats ford Ltd., London, 1995.

**AR8113**

**BASIC DESIGN**

**L T P/S C**

**0 0 12 6**

## **AIM:**

To understand the elements and principles of Basic Design as the building blocks of creative design through exercises that will develop the originality, expression, skill and creative thinking.

## **OBJECTIVES:**

- To involve students in a number of exercises to understand the grammar of design and visual composition.
- To enable the understanding of 3 D Composition by involving students in a number of exercises which will help generation of a form from a two dimensional / abstract idea.
- To enable the understanding of the relationship between the grammar of design and architecture by involving the students in seminars/ workshops and simple exercises which will look at building form analytically.

## **CONTENT:**

Introduction to Architectural Design through Basic Design – Elements of Design : Properties, qualities and characteristics of point, line, direction shape, form, colour and texture – Principles of Design: Scale, Proportion, Balance, Harmony, Rhythm and Contrast.

The course shall be conducted by giving a number of exercises in the form of design studios, seminars and creative workshops that are aimed at teaching the following:

- i). Elements and Principles of Visual Composition using point, line, shape.
- ii). Exploring colour schemes and their application in a visual composition and in Architectural forms and spaces.
- iii). Study of texture and schemes of texture both applied and stimulated and their application.
- iv). Study of linear and Planar forms using simple material like Mount Board, metal foil, box boards, wire string, thermocol etc.
- v). Study of Solids and voids to evolve sculptural forms and spaces and explore the play of light and shade and application of color.
- vi). Study of fluid and plastic forms using easily mouldable materials like clay, plaster of paris etc.
- vii). Analytical appraisal of building form in terms of visual character, play of light and shade, solids and voids etc.
- viii). Application of Basic design in Architectural Design through the manipulation of line, plane, solid and voids and application of texture colour, proportion etc.

**TOTAL: 180 PERIODS**

**REQUIRED READINGS:**

1. Owen Cappleman & Michael Jack Jordon, Foundations in Architecture : An Annotated Anthology of Beginning Design Project, Van Nostrand Reinhold New York, 1993.
2. Charles Wallschlagger & Cynthia Busic-Snyder, Basic Visual Concepts and Principles for Artists, Architects and Designers, Mc Graw Hill, New York 1992.

**REFERENCES:**

1. V.S.Pramar, Design fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Nelhi, 1973.
2. Francis D.K.Ching - Architecture - Form Space and Order Van Nostrand Reinhold Co., (Canaa), 1979.
3. Elda Fezei, Henny Moore, Hamlyn, London, New York, Sydney, Toronto, 1972.
4. C.Lawrence Bunchy - Acrylic for Sculpture and Design, 450, West 33rd Street, New York, N.Y.10001, 1972.
5. Exner. V, Pressel. D, Basics Spatial Design, Birkhanser, 2009.

**AIM:**

To make students aware of how structural resolutions become important in realization of architecture design concept. At this stage, students shall be exposed to forces, moments, and resolution that are to be resolved. Concepts of structures, and enable students to solve basic, simple problems.

**OBJECTIVES:**

- To enable a student to understand the effect of action of forces on a body and the concept of equilibrium of the body through exercises.
- To determine the internal forces induced in truss members due to external loads by working out problems.
- To calculate the sectional properties (centroid, moment of inertia, section modulus and radius of gyration) for various sections by working out problems.
- To study the stress – strain behaviors of steel and concrete due to axial loads and to determine the stresses and strains developed in solids due to external action through select problems.
- To derive the relationship between elastic constants and solving problems.

**CONTENT:****UNIT I FORCES AND STRUCTURAL SYSTEMS 8**

Types of force systems - Resultant of forces-Lami's theorem- principle of moments varignon's theorem - principle of equilibrium (no reaction problems) - simple problems

**UNIT II ANALYSIS OF PLANE TRUSSES 10**

Introduction to Determinate and Indeterminate plane trusses - Analysis of simply supported and cantilevered trusses by method of joints.

**UNIT III PROPERTIES OF SECTION 10**

Centroid- Moment of Inertia - Section modules – Radius of gyration - Theorem of perpendicular axis - Theorem of parallel axis –simple problems.

**UNIT IV ELASTIC PROPERTIES OF SOLIDS 10**

Stress strain diagram for mild steel, High tensile steel and concrete - Concept of axial and volumetric stresses and strains. (excluding composite bar)

## UNIT V ELASTIC CONSTANTS

7

Elastic constants - Relation between elastic constants - Application to problems.

**TOTAL: 45 PERIODS**

### REQUIRED READINGS

1. R.K.Bansal – A text book on Engineering Mechanics, Laxmi Publications, Delhi, 2005.
2. R.K.Bansal – A textbook on Strength of Materials, Lakshmi Publications, Delhi 2007.

### REFERENCES:

1. P.C.Punmia, Strength of Materials and Theory of Structures; Vol. I, Lakmi Publications, Delhi 1994.
2. S. Ramamrutham, Strength of Materials – Dhanpatrai & Sons, Delhi, 1990.
3. W.A.Nash, Strength of Materials – Schaums Series – McGraw Hill Book Company, 1989.
4. R.K. Rajput – Strength of Materials, S. Chand & Company Ltd. New Delhi 1996.

**AR8202**

**HISTORY OF ARCHITECTURE AND CULTURE II**

**L T P/S C**

**3 0 0 3**

### AIM:

To inform about the development of architecture in India from ancient times to its evolution through history under two religious movements- Buddhism and Hinduism- and the cultural and contextual determinants that produced that architecture.

### OBJECTIVES:

- To understand Indian architecture as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in the Indus valley Civilization, Vedic period and manifestation of Buddhist and Hindu architecture in various parts of the country.

### CONTENT:

## UNIT I ANCIENT INDIA

6

Indus Valley Civilization: culture and pattern of settlement.- Aryan civilization – theories and debates of origin- origins of early Hinduism - Vedic culture - Vedic village and rudimentary forms of bamboo and wooden construction - origins of Buddhism and Jainism.

## **UNIT II BUDDHIST ARCHITECTURE**

**10**

Evolution of Buddhism, Buddhist thought, art and culture - Hinayana and Mahayana Buddhism - interaction of Hellenic & Indian Ideas in Northern India - evolution of building typologies- the stupa, vihara and the chaitya hall - symbolism of the stupa - architectural production during Ashoka's rule Ashokan Pillar, Sarnath - rock cut caves at Barabar - Sanchi Stupa- rock cut architecture in Ajanta and Ellora - Karli - viharas at Nasik - Rani gumpha, Udaigiri - Takti Bahai, Gandhara.

## **UNIT III EVOLUTION OF HINDU TEMPLE ARCHITECTURE**

**10**

Hindu forms of worship – evolution of temple form - meaning, symbolism, ritual and social importance of temple - categories of temple - elements of temple architecture - early shrines of the Gupta and Chalukyan periods  
Tigawa temple - Ladh Khan and Durga temple, Aihole - Papanatha, Virupaksha temples, Pattadakal - Kailasanatha temple, Ellora.

## **UNIT IV TEMPLE ARCHITECTURE - SOUTHERN INDIA**

**12**

Brief history of South India - relation between Bhakti period and temple architecture - of temple towns - Dravidian Order - evolution and form of gopuram Rock cut productions under Pallavas: Shore temple, Mahabalipuram and Kailasanatha temple, Kanchipuram - Chola Architecture: Nartamalai, Brihadeeswara, Gangaikonda Cholapuram and Darasuram temples – temple gateways of Madurai and Chidambaram - temple towns: Madurai, Srirangam and Kanchipuram Hoysala architecture: Belur and Halebid.

## **UNIT V TEMPLE ARCHITECTURE -NORTHERN INDIA**

**7**

Temple architecture of Gujarat, Orissa, Madhyapradesh and Rajasthan - their salient features Lingaraja Temple, Bhuvaneswar - Sun temple, Konarak. - Somnatha temple, Gujarat, Surya kund, Modhera Khajuraho, Madhyapradesh - Dilwara temple, Mt. Abu

**TOTAL: 45 PERIODS**

### **REQUIRED READINGS:**

1. Percy Brown, Indian Architecture (Buddhist and Hindu Period), Taraporevala and Sons, Bombay, 1983.
2. Satish Grover, The Architecture of India (Buddhist and Hindu Period), Vikas Publishing Housing Pvt. Ltd., New Delhi, 2003.
3. Christopher Tadgell, The History of Architecture in India from the Dawn of civilization to the End of the Raj, Longmon Group U.K.Ltd., London, 1990.

### **REFERENCES:**

1. George Michell, The Hindu Temple, BI Pub., Bombay, 1977.

2. Stella Kramrisch The Hindu Temple, Motilal Banarsidass, 1976.
3. V.R. Parameswaranpillai, Temple culture of south India, Inter India Publications, 1985
4. George Michell Ed, Temple Towns of Tamil Nadu, Marg Pubs, 1995.
5. D.Raphael, Temples of Tamil Nadu; Works of Art, Fast Print Service Pvt Ltd., 1996.

**AR8203**

**THEORY OF ARCHITECTURE II**

**L T P/S C**

**3 0 0 3**

**AIM:**

This course is devised to introduce aspects of meaning and character in architecture and to enable holistic understanding of architecture through first hand experience.

**OBJECTIVES:**

- To introduce factors that lending meaning to architecture, expression, communication.
- To understand architecture as a product of historical context through introduction to aspects of style, character and architectural movements
- To understand the generation of individual meaning in architecture through study of philosophies/theories and exemplary works of architects
- To introduce thorough case studies, tools for representing, analyzing and interpreting architecture.
- To actually learn to represent, analyze and interpret the architectural experience holistically through live case studies

**UNIT I MEANING IN ARCHITECTURE**

**6**

Architecture as a vehicle of expressing, symbolism and communication- Illustrative examples

**UNIT II ARCHITECTURAL CHARACTER**

**9**

Ideas of character, style, architectural movement: Illustrative examples across various periods in history.

**UNIT III WORKS OF ARCHITECTS**

**12**

Role of individual architects in the generation of architectural form, through study of exemplary works, architectural inspirations, philosophies, ideologies and theories of architects.

## **UNIT IV ANALYZING ARCHITECTURE**

**9**

Introduction to modes of understanding architecture in totality in terms of the various aspects studied before in the subject – understanding how case studies have used representational, analytic and interpretational tools

## **UNIT V EXPERIENCING ARCHITECTURE**

**9**

Understanding architecture in totality in terms of the various aspects studied in this course firsthand experience, analysis and interpretation of building

**TOTAL: 45 PERIODS**

### **REQUIRED READING**

1. Yatin Pandya, Elements of Space making, Mapin 2007
2. SimonUnwin, Analyzing Architecture, Routledge 2003
3. Francis D.K.Ching, Architecture, Form, Space and Order; III Edition, John Wiley, 2007
4. Leland M.- Roth, Understanding Architecture: Its Elements- History, And Meaning, Icon Editions, 1993
5. HazeJ Conway, Rowan Roenisch, Understanding Architecture, Routledge 2005

### **REFERENCES**

1. Anthony Antoniades, Poetics of architecture - Theory of design, Wiley 2008
2. Steen Eiler Rasmussen - Experiencing architecture, MIT Press 1964
3. Peter von Meiss -Elements of architecture - From Form to Place, Span Press 1992
4. Bryan Lawson -How Designers Think, Architectural Press Ltd” London, 1980.
5. Hanno Rauterberg, Talking Architecture, interview with Architects, Preste12008 The A-Z of Modern Architecture- Taschen 2007.

**AR8204**

**BUILDING MATERIALS II**

**L T P/S C**

**3 0 0 3**

### **AIM:**

This course is devised to make students understand some basic materials of construction such as brick, clay products and timber and its various market forms.



## **OBJECTIVES:**

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as brick and other clay products.
- To inform the properties and characteristics of timber, its conversion, preservation and uses.
- To inform of the various market forms of timber, their production, properties and application in the building industry.

## **CONTENT:**

### **UNIT I BRICKS 10**

Classification of bricks including bricks substitutes like fly ash bricks, characteristics, ingredients of bricks – Manufacture of bricks – Forms of bricks – Testing of bricks – Storing – Light weight bricks – Case studies and application. Light weight bricks.

### **UNIT II CLAY PRODUCTS 12**

Manufacture of burnt clay bricks, paving bricks, hollow bricks – terracotta, porcelain, stoneware, earthenware Glazing and their uses – Glazed ceramic tiles, Fully vitrified tiles, Ceramic sanitary appliances, Stoneware pipes and fittings.

Roofing materials - Manufacture of Mangalore tiles, pot tiles, pan tiles – Case studies and application.

### **UNIT III TIMBER 8**

Classification of trees, structure of trees, Defects in timber, Storage of timber, Uses of timber, characteristics, seasoning of timber, Defects and diseases, Decay of timber, Preservation, Fire resistance, Conservation of timber,.

### **UNIT IV TIMBER PRODUCTS 8**

Market forms of timber, Industrial timber, - Veneers and Veneer Plywoods, Particle board, Hard board, Fibre board, Block board and Lamin boards, Laminates, advantages and Blockboard uses.

### **UNIT V PAINTING AND VARNISHING IN TIMBER 7**

Composition, characteristics, preparation, Primer, Painting different surfaces. Enamels, Paint, Varnishing – types of varnishing Miscellaneous paints, defects, uses and cost of materials.

**TOTAL: 45 PERIODS**

## **REQUIRED READINGS**

1. S. C. Rangwala, Engineering Materials, Charotar, Publishing House, Anand-388 001, India, 2007.
2. S.K. Duggal, Building materials, New Age International, New Delhi, 2009.
3. B. Reshpande, Materials and Construction, Oriental Watchman Publishing House, Poona-2.

## **REFERENCES:**

1. P.C. Varghese, Building Materials, Prentice Hall of India put Ltd, New Delhi 110001, 2005.
2. R.J. Spencke and S.J. Cook, Building materials in developing countries, John Wiley and sons 1983.

**AR8211**

**BUILDING CONSTRUCTION I**

**L T P/S C**

**0 0 5 3**

## **AIM**

This course is devised to provide an understanding of the various components that go into the making of a building shell and to focus on the various technicalities of construction and construction detail using some of the basic building materials.

## **OBJECTIVES**

- To involve students in a number of drawing exercises that will analyze the various building components in a simple load bearing structure.
- To involve students in a number of drawing exercises that will look at the design and detail of simple structures using naturally occurring materials such as mud, bamboo, straw, etc.
- To involve students in a number of drawing exercises that will look at the design and detail of various building components in a simple load bearing structure using stone.

## **CONTENT**

### **UNIT I INTRODUCTION**

**10**

Functional requirements of building and its components, introduction to concept of load bearing and framed structures. Exercises – involving the same.

<b>UNIT II</b>	<b>SOILS</b>	<b>20</b>
<p>Detailing of walls, roofs, flooring and foundations using soils (rammed earth, compressed blocks). Design exercises using soil for building components in small scale buildings like laborer's house, art centre, snack bar including detailing of arches, walls, door and window openings and understanding of the same through case studies.</p>		
<b>UNIT III</b>	<b>BAMBOO</b>	<b>13</b>
<p>Design and Construction Techniques using bamboo for building components for small scale buildings like snack bar, tree house including detailing of doors and windows, arches, barrel walls, weave structures and understanding of the same through case studies.</p>		
<b>UNIT IV</b>	<b>STRAW BALES</b>	<b>12</b>
<p>Design Exercises : using straw bales for building components for Load bearing, Post and Beam systems, Foundations systems, Roofing options, plastering, door and window detailing for small scale buildings and understanding of the same through case studies</p>		
<b>UNIT V</b>	<b>STONE</b>	<b>20</b>
<p>Design Exercises – Using stone (Ashlar, rubble etc.,) for building components including detailing of arches, corbels, coping, sills, lintels, corbels, arches, cladding in small scale buildings like classrooms, library and community hall and understanding the same through case studies</p>		
		<b>TOTAL: 75 PERIODS</b>
<b>REQUIRED READINGS:</b>		
<ol style="list-style-type: none"> <li>1. S.P Arora and S.P. Bindra, Text book of Building Construction, Dhanpat Rai &amp; Sons, New Delhi - 110002, 2012</li> <li>2. Klans Dukeeberg, Bambus – Bamboo, Karl Kramer Verlag Stuttgart Germany, 2000.</li> </ol>		
<b>REFERENCES:</b>		
<ol style="list-style-type: none"> <li>1. Don A. Watson Construction Materials and Processes McGraw Hill 1972, WB Mckey Building construction, Vol 1,2, Longman UK 1981.</li> <li>2. Barry, The Construction of Buildings Affiliated East West press put Ltd New Delhi 1999.</li> <li>3. Francisa D.K. Ching, Building Construction Illustrated John Wiley &amp; Sons 2000.</li> </ol>		

**AIM:**

To develop the skill of representation in advanced drawing techniques and building documentation.

**OBJECTIVES:**

- To involve students in a number of exercises that will help them develop the skill of representation in advance drawing techniques involving perspective and sciography.
- To involve students in a number of exercises that will help to understand the measured drawing method to document buildings of architectural interest using simple and advance techniques of representation.

**CONTENT:****UNIT I SCIOGRAPHY 10**

Principles of shade and shadow – construction of shadow of simple geometrical shapes – construction of sciography on building, shadows of architectural elements.

**UNIT II PERSPECTIVE: SCIENTIFIC METHOD 25**

Characteristic of perspective drawing. Concepts and methods of perspective drawing. One point and two point perspective of simple geometrical shapes like cube, prism, combination of shapes, simple one, two and three-point perspective of building interiors and exteriors. Adding of figures, trees furniture etc., shade and shadows and applying rendering techniques.

**UNIT III PERSPECTIVE: SHORT CUT METHOD 15**

Introduction to short cut perspective method. Adding of figures, trees furniture etc., shade and shadows and applying rendering techniques.

**UNIT IV MEASURED DRAWING: HISTORIC DOCUMENT STUDY 10**

Combined study of historic document along with small building by using simple measuring tools like tapes, photograph etc.

**UNIT V MEASURED DRAWING: DOCUMENTATION 15**

Documentation of a complete building of a special interest in terms of history, building construction, architectural excellence or technology.

**TOTAL: 75 PERIODS**

## **REQUIRED READINGS:**

1. John M.Holmes, Applied Perspective, Sir Isaac, Piotman and Sons Ltd., London 1954.
2. Robert W.Gill, Basic Perspective, Thames and Hudson, London, 1974.
3. C.Leslie Martin, Architectural Graphics, The Macmillan Company, New York, 1964.
4. Francis Ching, Architectural Graphics, Van Nostrand and Reinhold Company, NY 1975.

## **REFERENCES:**

### **I. MEASURED DRAWING**

1. Claude Batley, Design and development of Indian Architecture, D.B.Taraporevale Sons and Co., Ltd., Bombay, 1954.
2. William Kirby Lockard, Drawing as a Means to Architecture, Van Nostrand, Reinhold Company, New York.
3. George A Dinsmore, Analytical Graphics – D.Van Nostrand, Company Inc., Canada, 1968.

### **II. PERSPECTIVE**

4. Interiors: Perspective in Architectural Design Graphic - SMA Publishing Co. Ltd., Japan, 1967.

### **III. SCIOGRAPHY**

5. Ernest Norling, Perspective drawing, Walter Fostor Art Books, California, 1986.
6. Bernard Alkins - 147, Architectural Rendering, Walter Foster Art Books, 1986.
7. Rober W.Gill, Advanced Perspective, Thames and Hudson, London, 1974.

**AR8213**

**ARCHITECTURAL DESIGN I**

**L T P/S C**

**0 0 12 6**

## **AIM:**

To enable the conceptualization of form, space and structure through creative thinking and to initiate architectural design process deriving from first principles.

## **OBJECTIVES:**

- To involve students in a design project(s) that will involve simple space planning and the understanding of the functional aspects of good design.
- To involve students in a small scale building project(s) which will sensitize them to intelligent planning that is responsive to the environmental context.
- To involve students in building case study by choosing appropriate examples to enable them to formulate and concretize their concepts and architectural program.

- To engage in discussion and analytical thinking by the conduct of seminars/ workshops.
- To enable the presentation of concepts through various modes and techniques that will move constantly between 2D representation and 3D modeling.

### **CONTENT:**

Scale and Complexity: projects involving small span, single space, single use spaces with simple movement, predominantly horizontal, as well as simple function public buildings of small scale; passive energy

Areas of focus/ concern:

- architectural form and space
- aesthetic and psychological experience of form and space in terms of scale, colour, light, texture, etc.,
- function and need: user requirements, anthropometrics, space standards, circulation
- image and symbolism

Typology/ project: bedroom, bathroom, kitchen, shop, exhibition pavilion, children's environment, snack bar, residence, petrol bunk, fire station.

**TOTAL: 180 PERIODS**

### **REQUIRED READING :**

1. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001.
2. Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library of Design, 1975
3. Joseph De Chiara, Julius Panero, Martin Zelnik, Time Saver Standards for Interior Design and Space Planning, McGraw Hill 2001.
4. Ernst Neuferts Architects Data, Blackwell 2002
5. Ramsey et al, Architectural Graphic Standards, Wiley 2000

### **REFERENCES:**

1. Hideaki Hareguchi, A Comparative analysis of 20th century houses, Academy Editions, 1988
2. Robert Powell, Tropical Asian House, Select Books, 1996
3. Terence Conran, The Essential House Book, Conran Octopus, 1994
4. Sam F. Miller, Design Process: A Primer for Architectural and Interior Design, Van Nostrand Reinhold, 1995.

**AIM:**

To make students aware of how structural resolutions become important in realization of architecture design concept. At this stage, students shall be exposed to forces, moments, and resolution that are to be resolved. The focus is to study the concept of shear force and bending moment in beam section, deflection of beams and theory of columns and to know the concept of indeterminate structure.

**OBJECTIVES:**

- To enable a student to understand the basic concepts of shear force and bending moment acting on beams subjected to various loading conditions through exercises.
- To determine the stresses in beams and strength of sections by working out problems.
- To calculate deflection of beams using methods.
- To study the theory of columns by working out problems.
- To understand the concept of inter determinate structure and its analysis.
- Case studies and Models wherever feasible.

**CONTENT:****UNIT I      SHEAR FORCE AND BENDING MOMENT      10**

Basic concepts – shear force and bending moment diagrams for cantilever and simply supported beams subjected to various types of loadings (Point loads, uniformly distributed loads) – Over hanging simply supported beams – Point of contra flexure

**UNIT II      STRESSES IN BEAMS      10**

Theory of simple bending – Bending stress distribution – Strength of sections – Beams of composite sections (Flitched beams) – Shearing stress distribution in beam sections

**UNIT III      DEFLECTION OF BEAMS      10**

Slope and deflection at a point – Double Integration method and Macaulay's method for simply supported and cantilever beams

**UNIT IV      COLUMNS      10**

Short and long columns – Concept of Elastic stability – Euler's theory – Assumptions and Load carrying capacity of Columns with different end conditions – Concept of Effective length – Slenderness ratio – Limitations of Euler's theory – Rankine's formula.

## **UNIT V      STATICALLY INDETERMINATE BEAMS**

**5**

Introduction – Determination of degree of statically indeterminacy for beams and frames –  
Concept of Analysis (No Problems)

**TOTAL: 45 PERIODS**

### **REQUIRED READING:**

1. R.K. Bansal, A Text Book on Strength of Materials – Laxmi Publications, New Delhi, 2006.
2. B.C. Punmia, SMTS-I, Strength of Materials – Laxmi Publications, New Delhi, 1994.

### **REFERENCES :**

1. M.M. Ratwani & V.N. Vazirani, Analysis of Structures, Vol. 1, Khanna Publishers – Delhi, 1987.
2. Timoshenko, S.P. and D.H. Young, Elements of Strength of Materials, Fifth edition, East West Press, 1993.
3. A.R. Jain and B.K.Jain, Theory and analysis of structures, Vol. 1, Nemchand and Bros, Roorkee, 1987.
4. R.K. Rajput “Strength of Materials”, S.Chand & Company Ltd., New Delhi 1996.

**AR8302**

**HISTORY OF ARCHITECTURE AND CULTURE III**

**L T P/S C**

**3 0 0 3**

### **AIM:**

To inform about the development of architecture in the Western World through the evolution of Christianity as a religion and the cultural and contextual determinants that produced that architecture.

### **OBJECTIVES:**

- To understand Church architecture as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in the Western World through the evolution of the church from early Christian times up to the Renaissance period.



## **CONTENT:**

### **UNIT I EARLY CHRISTIAN 6**

Birth and spread of Christianity – transformation of the Roman Empire – early Christian worship and burial.

Church planning – basilican concept: St. Clement, Rome; St. Peters Rome, - Centralized plan concept: S, Vitale, Ravenna; S. Hagia Sophia, Constantinople; St. Marks, Venice.

### **UNIT II EARLY MEDIEVAL PERIOD 9**

The Carolingian Renaissance – Feudalism and rural manorial life – Papacy – Monasticism – Craft and merchant guilds.

Medieval domestic architecture – Medieval monasteries- Monastery of Cluny III, Cluny - Romanesque churches – Development of vaulting – Pisa Group – Abbaye aux Hommes – Durnham cathedral.

### **UNIT III LATE MEDIEVAL PERIOD 9**

Political and social changes: Re-emergence of the city – Crusades, - Scholasticism. Development of Gothic architecture Church plan, structural developments in France and England – Notre Dame, Amiens; Notre Dame, Paris; Salisbury Cathedral; Westminster Abbey – wooden roofed churches – domestic architecture.

### **UNIT IV RENAISSANCE AND MANNERIST 12**

Idea of rebirth and revival – Humanism – Development of thought – the Renaissance patron – Urbanism Renaissance architecture: Brunelleschi and rationally ordered space – ideal form and the centrally planned church: Alberti and Donato Bramante – Merchant Prince palaces: Palazzo Ricardi – Villas of Palladop : Villa Capra Vicenza – Mannerist architecture : The Renaissance in transition – Michaelangelo : Library at S. Lorenzo, Florence, Capitoline Hill – Inigo Jones.

### **UNIT V BAROQUE AND ROCOCO 9**

Protestantism – Counter Reformation – French Revolution – Monarchy and growth of nations.

Roman Baroque churches: The central plan modified – St. Peters, Rome; French Baroque : Versailles – English baroque – Sir Christopher wren ; St. Paul’s London – Domestic Architecture in England. Rococo Architecture – Interiors – hotels.

**TOTAL: 45 PERIODS**

## **REQUIRED READINGS:**

1. Sir Banister Fletcher, A History of Architecture, CBS Publishers, 1996.
2. Spiro Kostof - A History of Architecture - Setting and Rituals, Oxford University Press, London, 1985.

## **REFERENCES:**

1. Pier Luigi Nervi, General Editor - History of World Architecture - Series, Harry N.Abrams, Inc.Pub., New York, 1972.
2. S.Lloyd and H.W.Muller, History of World Architecture - Series, Faber and Faber Ltd., London, 1986.
3. Vincent Scully: Architecture; Architecture – The Natural and the Man Made: Harper Collins Pub: 1991.
4. Leland M Roth; Understanding Architecture: Its elements, history and meaning; Craftsman House; 1994

**AR8303**

**CLIMATE AND BUILT ENVIRONMENT**

**L T P/S C**

**3 0 0 3**

## **AIM:**

To enable the understanding of the technical basis of the environment which exists in or around a building and to integrate the requirements of climate in building and in relation to building functions.

## **OBJECTIVES:**

- To study human heat balance and comfort.
- To familiarize students with the design and settings for buildings for daylight and factors that influence temperature
- To inform about the air pattern around buildings and the effect of wind on design and siting of buildings
- To expose the students to the various design strategies for building in different types of climatic zones.

## **CONTENT:**

### **UNIT I CLIMATE AND HUMAN COMFORT**

**10**

Factors that determine climate of a place – Components of Climate – Climate classifications for building designers in tropics – Climate characteristics. Human body heat balance – Human

body heat loss – Effects of climatic factors on human body heat loss – Effective temperature – Human thermal comfort – Use of C.Mahony's tables.

**UNIT II DESIGN OF SOLAR SHADING DEVICES 8**

Movement of sun – Locating the position of sun – Sun path diagram – Overhead period–Solar shading–Shadow angles – Design of appropriate shading devices

**UNIT III HEAT FLOW THROUGH BUILDING ENVELOPE CONCEPTS 9**

The transfer of heat through solids – Definitions – Conductivity, Resistivity, Specific heat, Conductance, Resistance and Thermal capacity – Surface resistance and air cavities– Air to air transmittance ( U value ) – Time lag and decrement – Types of envelopes with focus on glass.

**UNIT IV AIR MOVEMENT DUE TO NATURAL AND BUILT FORMS 9**

The wind – The effects of topography on wind patterns – Air currents around the building – Air movement through the buildings – The use of fans – Thermally induced air currents – Stack effect, Venturi effect – Use of court yard.

**UNIT V CLIMATE AND DESIGN OF BUILDINGS 9**

Design strategies in warm humid climates, hot humid climates, hot and dry climates and cold climates – Climate responsive design exercises

**TOTAL: 45 PERIODS**

**REQUIRED READINGS:**

1. O.H. Koenigsberger and Others, Manual of Tropical Housing and Building – Part I - Climate design, Orient Longman, Madras, India, 2010.
2. Bureau of Indian Standards IS 3792 (1987), Hand book on Functional requirements of buildings other than industrial buildings, (Part I – IV), Manakbhavan, 9, Bahadur Shah Zafar Marg, New Delhi – 110002

**REFERENCES:**

1. Martin Evans ( 1980 ), Housing Climate and Comfort – Architectural Press, London
2. B. Givoni (1981), Man, Climate and Architecture, Architectural Sciences Series - Applied Science Publishers Ltd., London
3. B. Givoni (1994) Passive and Low Energy Cooling of building, Van Nortrand Reinhold New York, USA.

4. Galloe, Salam and Sayigh A.M.M. (1998) "Architecture, Comfort and Energy", Elsevier Science Ltd. , Oxford, U.K.

**AR8304**

**BUILDING MATERIALS III**

**L T P/S C**

**3 0 0 3**

**AIM:**

This course is devised to make students understand the materials of construction such as cement, concrete, paints and other surface finishes and their applications in the building industry.

**OBJECTIVES:**

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as cement, glass, paints and other finishing materials.
- To inform about the properties, characteristics and use of concrete in construction including its manufacture
- To inform about the properties, characteristics and manufacture of various type of concrete using aggregates.

**UNIT I      REQUIREMENTS OF INGREDIENTS FOR MORTAR/ CONCRETE      6**

Cement: definition, composition, strength, properties, manufacture, test for cement, types of cement

Sand : sources, impurities, classification, tests for bulking of sand, quality of sand

Coarse aggregate : Sources, shape, size, grading, sampling and analysis, impurities

Water: sources, requirements, water quality, tests

**UNITII      CEMENT CONCRETE AND ITS MANUFACTURE      6**

Definition, properties, specification, proportioning, water-cement ratio, workability, curing, water-proofing, guniting, special concretes.

Manufacture, construction of formwork, placing, quality assurance testing, fabrication, incorporation of steel in concrete.

**UNIT III TYPES OF CONCRETE AGGREGATES AND CONCRETE****9**

Lightweight aggregates, aerated concrete, no-fines concrete, polymer concrete, RCC, pre-stressed concrete, fibre-reinforced concrete, ready-mixed concrete

**UNIT IV SURFACE FINISHING, FLOORING AND DAMP-PROOFING****12**

Surface finishing: Smooth finishes, textured finishes, ribbed, etched, exposed aggregate finish- weathering of finishes- external renderings- roughcast, dry dash, textured, stucco, gypsum and POP applications, protective and decorative coatings.

Paints- properties and defects in paints, enamels, distemper, plastic emulsion, special paints- fire retardant, luminous and bituminous paints.

Materials for damp-proofing and water-proofing concrete structures: Hot and cold applications, emulsified asphalt, vinyl, epoxy resins, chemical admixtures, bentonite clay etc.- properties, uses and cost of materials.

Types of flooring- laying methods for marble, mosaic, and terrazzo, plain cement flooring, flooring stones & tiles.

**UNIT V GLASS****12**

Composition of glass, brief study on manufacture, treatment, properties and uses of glass. Types of glass- float glass, cast glass, glass blocks, foamed glass. Decorative glass, solar control, toughened glass, wired glass, laminated glass, fire-resistant glass, glass blocks, structural glass - properties and application in building industry, glazing and energy conservation measures.

**TOTAL: 45 PERIODS****REQUIRED READING:**

1. M.S.Shetty, Concrete Technology, S.Chand & Co.ltd, New Delhi, 1986.
2. S.C.Rangwala, Engineering Materials, Charotar Publishing House, India, 1997.
3. S.K Duggal, Building Materials, Oxford and IBM Publishing Co, Pvt Ltd, 1997.

**REFERENCES:**

1. Arthur Lyons - Materials for Architects and Builders - An introduction Arnold, London, 1997.
2. Don A.Watson, Construction Materials and Process, McGraw Hill Co., 1972.
3. S.N Sinha, Reinforced Concrete Design, Tata-McGraw Hill, New Delhi, 2002

4. Howard Kent Preston, Prestressed concrete for Architects and Engineers, McGraw Hill, New York, 1964

**AR8305**

**COMPUTER AIDED VISUALISATION**

**L T P/S C**

**1 0 3 3**

**AIM:**

The lecture program and practical engage students with understanding of the Software, Visual languages, Design fundamentals and Visual literacy which provide the fundamental understandings required for the Medium.

**OBJECTIVES:**

- To introduce Computer operation principles and explore image editing through a visual composition using graphics.
- To impart training in Computer aided 2D drafting and 3D Modeling through projects
- To enable the rendering of a building so as to create a photo realistic image.

**CONTENT:**

**UNIT I INTRODUCTION TO COMPUTER AND IMAGE EDITING 10**

Technology of small computer system, computer terminology operation principles of P.C., introduction to application software, and graphic system, and use of printers, scanner, plotter, File management, etc. Understanding Bitmap images and Vector Graphics, Image size and Resolution. Basic Tools for Editing and Creating Graphics.

**UNIT II THE BASICS OF BUILDING MODELLING 15**

Creating a basic floor plan, About Temporary Dimensions, Adding and Modifying Walls, Working with Compound Walls, Using Editing Tools, Adding and Modifying Doors, Adding and Modifying Windows

**UNIT III VIEWING THE BUILDING MODEL 15**

Understanding the drawing unit's settings, scales, limits, drawing tools, drawing objects, object editing, and text, dimensioning. Transparent overlays, hatching utilities, line type, line weight and colour. Multiline, Polyline, etc. Styles, blocks and symbol library.

## UNIT IV INTRODUCTION TO 3D MODELLING

15

Project: Create 3D sculpture using 3D primitives (cubes, spheres etc.)

Tools: Slide facilities script attributes, V-port, editing session. Introduction to 3D-modelling technique and construction planes, drawing objects, 3D surfaces setting up elevation thickness and use of dynamic projections. Solid modeling with primitive command and Boolean operation.

## UNIT V 3D RENDERING AND SETTING

20

Project: Visualize a building. Explore the potential of lights and camera and use the same in the model created for the final submission.

Tools: Rendering and scene setting to create a photo realistic picture, understanding material mapping, environment setting and image filling. Exercise to identify and visualize a building using the above said utilities.

**TOTAL: 75 PERIODS**

### REQUIRED READING:

1. Photoshop 7 Bible Professional Edition, Wiley John & Son INC, New York, DekeMcClelland, 2000.
2. AutoCAD architectural user guide – Autodesk Inc., 1998.
3. A. Watt, Fundamentals of Three-Dimensional Computer Graphics, Addis Wesley, Massachusetts, 1989.

### REFERENCES:

1. The Illustrated AutoCAD 2002 Quick Reference, Ralph Grabowski,
2. Autocad 2000: A Problem-Solving Approach, Sham tikoo. Pub: Thomson Learning, 1999.
3. 3D MAX - 6 Bible, Wiley, 2004.

**AR8311**

**BUILDING CONSTRUCTION II**

**L T P/S C**

**0 0 5 3**

### AIM:

This course is devised to provide an understanding of brick and clay products and timber and industrial timber products that go into making of structural and non structural components of building.

## **OBJECTIVES**

- To understand both in general and in detail the methods of construction by using basic materials such as brick; clay products and natural timber for both structural and non-structural components.
- To understand both in general and in detail the methods of construction by using man-made timber products such as ply wood.
- To understand the quality assurance measures and testing procedures related to material, workmanship and performance for the topics discussed.

## **CONTENT:**

### **UNIT I BRICKS & CLAY PRODUCTS**

**15**

#### **BRICKS**

Basics of brick bonding principles, exercises involving different types of brick bonding. Design and construction of various structural components using bricks in single or (Ground+1) buildings – small house, community hall, snack bar etc. and understanding the same through case studies including methods of construction of various non-structural building components such as partition walls, screens, compound walls, parapets, coping - understanding the same through exercises and case studies.

#### **CLAY PRODUCTS**

Design exercises using clay blocks for flooring, roofing and walling in single or (Ground+1) buildings including detailing of Mangalore tiles, pot tiles, pan tiles roofing -understanding the same through exercises and case studies.

### **UNIT II TIMBER JOINERY**

**20**

Methods of construction using natural timber in joinery works including methods of fixing and options for finishing - Windows (panelled, louvered, glazed and sliding windows) - Doors (panelled, glazed, sliding, sliding/folding, louvered and pivoted) – Ventilators (top hung, bottom hung, pivoted, louvered, and glazed) – Hardware for doors, windows and ventilators - Exercises involving the above through drawings and application of the above for a single or (G+1) building with schedule of joinery.

### **UNIT III TIMBER WALLS, FLOORS, TRUSSES AND STAIRCASES**

**10**

Methods of construction using natural timber in various structural components of the building such as walls, floors, roof trusses - Exercises involving the above through case studies - Types of timber staircases. Methods of construction of timber staircases- basic principles and design details including detailing of handrail and baluster- Exercises involving the above through drawings.



**UNIT IV    TIMBER PARTITIONS, PANELLING, FLASE CEILING****20**

Methods of construction using man-made timber products such as ply woods, block boards, etc., in fixed partitions, sliding/folding partitions, wall panelling, false ceiling - Exercises of the above through drawings and case studies.

**UNIT V    GLASS****10**

Construction methods using glass for single storey glass structures like pavilions, green houses, staircases. Construction methods using glass for single/multi-storey buildings including curtain walling details – Exercises of the above through case studies and drawings.

**TOTAL: 75 PERIODS****REQUIRED READING**

1. Don A. Watson, "Construction Materials and Processes", McGraw Hill, 1972.
2. W.B. McKay, "Building Construction" Vol, 1 and 2, Longmans, UK, 1981.
3. S.C Rangwala "Building Construction" Charotar Publishing House, India, 2000
4. S.K.Sharma, "A Text book of Building Construction", S.Chand & Co Ltd., New Delhi, 1998

**REFERENCES**

1. American Institute of Timber Construction (AITC), Timber Construction Manual, Wiley Publishers, 2004
2. Francis D.K Ching Building Construction illustrated, John Willey & Sons, 2008.
3. Wills H Wagner, Howard Bud, Modern Carpentry, Good Heart – Wilcox publishers, Portland, 2003
4. Barry, Construction of Buildings, Volume 1&2, Blackwell Publishing Ltd., Oxford, 2005.

**AR8312****ARCHITECTURAL DESIGN II****L T P/S C****0 0 14 7****AIM:**

To create an understanding of the inter relationships amongst various elements of architecture – form, function, space planning, user perception and behaviour.

**OBJECTIVES:**

- To understand the characteristics of site and the importance of site planning which includes built form and open space.

- To understand the relationship between form and spaces and the importance of aesthetics.
- To ascertain the response of user group through case studies.
- To enable the presentation of concepts through 2D drawings, sketches and model.

### **CONTENT:**

Scale and Complexity :Project involving organization of multiples of single unit space with predominantly horizontal movement as well as single use public buildings of small scale; passive energy

Areas of concern/ focus:

- form-space relationships
- spatial organization
- behavioral aspects especially those relating to children
- site planning aspects
- appropriate materials and construction

Suggestive Typologies/ projects: residential buildings, institutional buildings: nursery or primary schools, schools for children with specific disabilities, primary health center, banks, neighbourhood market, neighbourhood library, Gate complexes including security Kiosk and entry / exit gates.

**TOTAL: 210 PERIODS**

### **REQUIRED READING**

1. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001.
2. Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library of Design, 1975
3. Joseph De Chiara, Julius Panero, Martin Zelnik, Time Saver Standards for Interior Design and Space Planning, McGraw Hill 2001.
4. Ernst Neuferts Architects Data, Blackwell 2002
5. Ramsey et al, Architectural Graphic Standards, Wiley 2000

### **REFERENCES**

1. Richard P. Dober, Campus Planning - Reinhold Book Corporation, 1963
2. Kanvinde, Campus design in India, American year Book, 1969
3. Kevin Lynch, Site planning, MIT Press, Cambridge, 1967



## **UNIT V     STEEL BEAMS**

**8**

Introduction – laterally supported and unsupported beams – Design of laterally supported beams.

**TOTAL: 45 PERIODS**

### **REQUIRED READING**

1. L.S. Negi, Design of Steel Structures – Tata McGraw Hill Publishing Company Ltd., New Delhi, 1997.
2. S. Ramachandra, Design of Steel Structures - Standard Book House, Delhi, 1984.
3. Ramamurutham .S, Narayanan .R, Design of Steel Structures, Dhanpat Rai – Sons, 2006.
4. Punmia B.C., Design of Steel Structures, Laxmi Publications, 2005.

### **REFERENCES:**

1. A.S.Arya, Structural Design in Steel, Masonry and Timber, Nemchand and Bros, Roorkee, 1971.
2. National Building Code of India, 1983, Part VI, Structural Design.
3. Gurucharan Singh, Design of Steel Structures, Standard Publishers, New Delhi, 1982.
4. Dayaratnam.P, Design of Steel Structures, Oxford and IBH Publishing Co.
5. IS 883 – Code of Practice for Design of Structural Timber in Buildings
6. IS 800 - 2007 – Code of Practice for use of Structural Steel in General Building Construction

**AR8402**

**HISTORY OF ARCHITECTURE AND CULTURE IV**

**L T P/S C**

**3 0 0 3**

### **AIM:**

To inform about the development of architecture in Asia particularly India through the evolution of Islam as a religion and the cultural and contextual determinants that produced that architecture.

### **OBJECTIVES:**

- To understand Islamic architecture as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in the Indian context through the evolution of the mosque and tomb in

the various phases of Islamic rule in the country.

- To gain knowledge of the expertise of the Mughal rulers in city building and garden design.

## **CONTENT:**

### **UNIT I INTRODUCTION TO ISLAMIC ARCHITECTURE 8**

History of Islam: birth, spread and principles - Islamic architecture as rising from Islam as a socio-cultural and political phenomenon- evolution of building types in terms of forms and functions: mosque, tomb, minaret, madarasa, palace, caravanserai, market - character of Islamic architecture: principles, structure, materials and methods of construction, elements of decoration, colour, geometry, light

### **UNIT II ISLAMIC ARCHITECTURE IN INDIA & ARCHITECTURE OF THE DELHI SULTANATE 12**

Advent of Islam into the Indian subcontinent and its impact including the change in the architectural scene- overview of development based on political history and the corresponding classification of architecture - Islamic architecture in India: sources and influences

Establishment of the Delhi Sultanate- evolution of architecture under the Slave, Khalji, Tughlaq, Sayyid and Lodhi Dynasties – tombs in Punjab- important examples for each period

### **UNIT III ISLAMIC ARCHITECTURE IN THE PROVINCES 8**

Shift of power to the provinces and evolution of regional architecture with their own unique influences: geographic, cultural, political, etc., - Bengal, Gujarat, Jaunpur, Malwa, Kashmir, Deccan (Gulbarga, Bidar, Golconda and Bijapur) - important examples for each region

### **UNIT IV MUGHAL ARCHITECTURE 9**

Mughals in India- political and cultural history- synthesis of Hindu-Muslim culture, Sufi movement - evolution of architecture and outline of Mughal cities and gardens under the Mughal rulers: Babur, Humayun, Akbar, Jahangir, Shahjahan, Aurangzeb- important examples- decline of the Mughal empire.

### **UNIT V CROSS-CULTURAL INFLUENCES 8**

Cross cultural influences across India and secular architecture of the princely states: Oudh, Rajput, Sikh, Vijayanagara, Mysore, Madurai- important examples

**TOTAL: 45 PERIODS**

### **REQUIRED READINGS:**

George Mitchell, Architecture of the Islamic World - its history and social meaning, Thames and Hudson, London 1978.

Robert Hillenbrand, Islamic Architecture- Form, Function and Meaning, Edinburgh University Press 1994.

Brown Percy, Indian Architecture (Islamic Period), Taraporevala and Sons, Bombay 1983.

4. Satish Grover, Islamic Architecture in India, CBS Pub, New Delhi 2002

### **REFERENCES:**

1. Christopher Tadgell, The History of Architecture in India, Penguin Books (India) Ltd, New Delhi 1990.

2. R.Nath - History of Mughal Architecture Vols I to III - Abhinav Publications - New Delhi, 1985.

3. Catherine Asher, Architecture of Mughal India, Cambridge University Press 2001

4. Architecture in Medieval India: Forms, Contexts, Histories, edited by Monica Juneja. New Delhi, Permanent Black 2001

**AR8403**

**ENVIRONMENTAL SCIENCE**

**L T P C**

**3 0 0 3**

### **OBJECTIVES:**

At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non-government organization in environment managements.

### **UNIT I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES**

**10**

Definition, scope and importance of environment – need for public awareness - Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non

renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

## **UNIT II ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY**

**14**

Concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

Field study of common plants, insects, birds; Field study of simple ecosystems – pond, river, hill slopes, etc.

## **UNIT III ENVIRONMENTAL POLLUTION**

**8**

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.

Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

## **UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT**

**7**

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act

– Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

## **UNIT V HUMAN POPULATION AND THE ENVIRONMENT**

**6**

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

**TOTAL: 45 PERIODS**

### **TEXT BOOKS:**

1. Gilbert M.Masters, “Introduction to Environmental Engineering and Science”, 2nd edition, Pearson Education, 2004.
2. Erach Bharucha, “Text book of Environmental Studies”, University Press, Hyderabad, 2006.
3. Anubha Kaushik and Kaushik C.P., “ Perspectives in Environmental Studies” New age International (P) Ltd., New Delhi, 2005
4. Venugopala Rao.P, “ Principles of Environmental Science and Engineering” Prentice Hall of India Pvt. Ltd., New Delhi, 2006.

### **REFERENCES:**

1. Cunningham, W.P. Cooper, T.H. Gorhani, “Environmental Encyclopedia”, Jaico Publ., House, Mumbai, 2001.
2. Dharmendra S. Sengar, “Environmental law”, Prentice hall of India PVT LTD, New Delhi, 2007.
3. Rajagopalan, R, “Environmental Studies-From Crisis to Cure”, Oxford University Press, 2005.
4. Richard T. Wright, “Environmental Science” Prentice Hall of India Pvt. Ltd., New Delhi 2007.



**AIM:**

This course is devised to make students understand ferrous and non ferrous materials of construction as well as plastics and their applications in building industry.

**OBJECTIVES:**

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such steel and steel alloys, aluminum and aluminum alloys.
- To inform the innovations in the steel industry and the standards and accepted industrial practices involved.
- To inform the properties, characteristics and application of plastics in the construction industry as well as other light weight roofing materials.

**UNIT I FERROUS METALS: STEEL****9**

Iron ore: definition, introduction, manufacture of iron ore, types- pig iron, wrought iron and cast iron- their properties and uses.

Steel- definition, properties, Manufacture, casting, heat treatment, mechanical treatment process of steel, market forms of steel, fire protection of steel - Corrosion of ferrous metals (Causes, factors of corrosion and prevention).

**UNIT II STEEL ALLOYS AND INNOVATIONS IN STEEL INDUSTRIES****9**

Steel alloys- properties and uses. Structural steel-definition and protection. Steel sheeting- types of sheeting. Stainless steel in building Industry as a structural entity by studying codes. Study of innovations in steel industry. Design and construction parameters developed by INSDAG.

**UNIT III NON-FERROUS METALS****9**

Aluminium and Aluminums Alloys (Manufacture, properties, durability, and uses) - Aluminium products (extrusions, foils, castings, sheets etc.) - Other non-ferrous metals copper, lead, zinc (Manufacture, grades, forms, sizes) - Study of protection to non-ferrous metals and products such as anodizing, powder coating, painting, stove enamelling, chromium plating, varnishing, melamine treatments.

## **UNIT IV PLASTICS**

**9**

Polymerisation, thermoplastics, thermosetting plastics, elastomers, properties of plastics, strength, plastic forming process, uses of plastics and decorative laminates - Plastics in construction (polythene, poly propylene, PVC, ethylene, polycarbonate, acrylic flooring, PVC tiles)

## **UNIT V OTHER MATERIALS**

**9**

Light-roofing materials (Recent trends in roofing materials like Corrugated GI Sheets, Pre-coated metal sheets, Polycarbonate sheeting, Teflon coated sheets, PTFE Steel alloys properties and uses) - Adhesives, Sealants and joint fillers (Relative movement within buildings, types of sealants- elasto-plastic, elastic sealants- joint design- fire resistant sealants- gaskets- adhesives, epoxy, wall paper, bitumen, plastic pipe) - Materials for flooring finishes such as epoxy, oxy-chloride, hardeners, PVC, carpets.

**TOTAL: 45 PERIODS**

### **REQUIRED READING:**

1. S.C.Rangwala, Engineering Materials, Charotar Publishing House, India, 1997.
2. S.K Duggal, Building Materials, Oxford and IBM Publishing Co, Pvt. Ltd., 1997.
3. P.C Varghese, Building Materials, Prentice Hall of India Pvt. Ltd., New Delhi, 110001, 2005

### **REFERENCES:**

1. Don A.Watson, Construction Materials and Process, McGraw Hill Co., 1972.
2. Arthur Lyons - Materials for Architects and Builders - An introduction Arnold, London, 1997.
3. Gorenc, Tinyou, Syam, Steel Desinger's Handbook, CBS Publishers and Distributors, New Delhi, Bangalore, 2005
4. Ralph Monletta, Plastics in Architecture – A guide to acrylic and Polycarbonate, Marcel Dekker Inc, New York, 1989
5. Jack M Landers, Construction Materials, Methods, Careers, Good Heart-WilCox Company, Inc Publishers, Homewood, IL, 1983

**AIM:**

The course is designed to familiarize the students with building services that support the functioning of a building in the area of water supply, sewerage, drainage and solid waste.

**OBJECTIVES:**

- To Study Water supply, treatments, distribution and plumbing system for all type of buildings.
- To Study Waste water treatments, Sewer lines for all types of buildings.
- To Study Drainage system for a Small Campus and a Residential neighbourhood.
- To understand Refuse collections, disposal, composting, Landfill, Bio gas for a Town and City.
- Applications of all the above systems to a Buildings, Small Campus and a Residential neighbourhood.

**CONTENT:****UNIT I WATER QUALITY, TREATMENTS AND DISTRIBUTION 12**

Sources of water supply – Water Quality - Water requirements for all type of residential, commercial, Industrial buildings and for town – Water treatment methods – Screening, aeration, Sedimentation, Filtration, Disinfection, Softening, conveyance of water – Distribution of water – Choice of pipe materials - Types of fixtures and fittings – System of plumbing in all type of buildings.

**UNIT II WASTE WATER, TREATMENTS AND DISPOSAL 12**

Waste water – Sewage disposal, primary treatment. Secondary treatment, Biological treatment and Modern types of Sewage Treatment Plants - Sewer line fixtures and traps, Manholes, Septic tank.

**UNIT III STORM WATER DRAINAGE AND RAIN WATER HARVESTING 10**

Basic principles of storm water drainage – drain pipes and type of pipe – storm water gutter – rain water harvesting principles – storage sumps

**UNIT IV SOLID WASTE, COLLECTIONS, TREATMENTS, DISPOSAL, MODERN DRAINAGE SYSTEMS 12**

Refuse collection, disposal, Incinerator, Composting, Vermicomposting, Sanitary Land filling, Bio gas system and Modern renewable energy system. Modern plumbing system, drainage collection system, disposal for a housing colony, small towns – Selection of pumps and Construction of pump rooms.

**UNIT V APPLICATION OF THE ABOVE UNITS 14**

Layout design and details of water supply distribution system in a Campus or Small residential neighbourhood - Layout design and details of sewage and drainage system for different types of buildings - water supply pipe lines, storm water drainage pipe lines and Rain water Harvesting for small residential neighbourhood.

**TOTAL: 60 PERIODS**

**REQUIRED READINGS:**

1. Manual of water supply and treatment, Second edition, CPHEEO, Ministry of works and housing, New Delhi 1977
2. AFE Wise, JA Swaffied Water, Sanitary & Waste Services in buildings – Mitchell Publishing Co. Ltd. – 2002, V Edition
3. Punmia B.C., Waste Water Engineering, Laxmi Publications, 2009.
4. Arceivala S.J., Waste Water Treatment for Pollution Control, Tata McGraw Hill, 2008.

**REFERENCES:**

1. G.M. Fair, J.C. Geyer and D.Okin, Water and Waste water engineering Volume II, John Wiley & Sons, Inc. New York, 1968
2. Manual on sewerage and sewerage treatment, CPHEEO – Ministry of works and housing, New Delhi, 1980
3. S.C.Rangwala, Water supply and sanitary engineering, Chartar publishing house, Anand, 1989
4. Renewable energy, basics and technology, supplement volume on integrated energy systems) Auroville, 1998 Sri Aurobindo Ashram, Pondicherry 605002 India



**UNIT IV    ADVANCED CONSTRUCTION SYSTEMS DEVELOPED BY RESEARCH ORGANISATIONS IN INDIA**

**10**

Design and detailing of building materials and components developed by research organizations like CBRI, SERC, NBO, and BMTPC – Exercises of the above through case studies and drawings.

**UNIT V    PLASTICS AND OTHER MATERIALS**

**15**

Design and construction details using primary plastic building products for walls, partitions and roofs. Design and construction details using secondary building products for windows, doors, rooflights, domes, and handrails. Use of GI Sheets, Polycarbonate sheets, Teflon.

**TOTAL: 75 PERIODS**

**REQUIRED READING**

1. M.S.Shetty, Concrete Technology, S.Chand & Co.ltd,New Delhi,1986.
2. Dr. B.C.Punmia, A Text book of Building Construction, Laxmi Publications Pvt. Ltd., New Delhi, 2005.
3. 3.T.D Ahuja and G.S. Birdie, Fundamentals of Building Construction, Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 1996
4. S.P Arora and S.P Bindra, A Text Book of Building Construction - Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 1990

**REFERENCES:**

1. Alan Blanc, Stairs, Steps and Ramps, Butterworth, Heinemann Ltd., 1999
2. Francis D.K Ching Building Construction illustrated, John Willey & Sons, 2000
3. W.B. McKay, "Building Construction" Vol, 1 and 2, Longmans, UK, 1981.
4. Barry, Construction of Buildings, Volume 1&2, Blackwell Publishing Ltd., Oxford, 2005
5. Pamphlet and Manuals supplied or published by SERC, BMPTC, HUDCO and Other research organization
6. Standard and Specification for cost effective innovation, Building Materials and Sequence, BMPTC Publication, New Delhi
7. R. Chudley, Construction Technology, Richard Clay, Chanur Press, 1980.
8. R.M. Davis, Plastics in Building Construction, Battersea College of Technology, Blackie, London, 1966

**AIM:**

To create a holistic understanding of the socio-cultural, geographic and economic aspects that shape the built environment as well as to expose the students towards the design of simple community oriented buildings.

**OBJECTIVES:**

- To make a comprehensive study of a rural settlement that is an exemplar of collective design evolved organically over a period of time.
- To expose the students on the methodology of conducting various surveys covering, physical, visual characteristics and demographic aspects.
- To understand the vernacular / traditional architecture involving local materials and construction techniques.
- To emphasise on the importance of designing built form and open spaces that meet the aspirations of the community.
- To enable the presentation of concepts through 2D and 3D presentation including sketches and model.

**CONTENT:**

Scale and Complexity: Projects involving public and community oriented buildings -multi room, single use, small span, multiple storied, horizontal and vertical movement; active cum passive energy; comprehensive analysis of rural settlement in a hierarchical manner.

Area of concern/ focus :

- rural settlements and architecture
- community oriented design
- simple public buildings (not more than Ground+ 2 floors)

Suggestive Typologies/ projects : Rural projects that involve studies and design at settlement and building level- noon meal centre, market, primary health centre; department store, higher secondary school, campus students centre

**TOTAL: 210 PERIODS**

## **REQUIRED READING**

1. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001.
2. Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library of Design, 1975
3. Joseph De Chiara, Julius Panero, Martin Zelnik, Time Saver Standards for Interior Design and Space Planning, McGraw Hill 2001.
4. Ernst Neuferts Architects Data, Blackwell 2002
5. Ramsey et al, Architectural Graphic Standards, Wiley 2000

## **REFERENCES:**

1. Richard P. Dober, Campus Planning - Reinhold Book Corporation, 1963
2. Kanvinde, Campus design in India - American year Book, 1969
3. Kevin Lynch, Site planning, MIT Press, Cambridge, 1984
4. Sam F. Miller, Design Process: A Primer for Architectural and Interior Design, Van Nostrand Reinhold, 1995

**AR8501**

**DESIGN OF STRUCTURES II**

**L T P/S C**

**3 0 0 3**

## **AIM:**

To facilitate the design of Reinforced concrete beams and slabs by working stress method and limit state method.

## **OBJECTIVES:**

- To inform about the methods of design through working stress and limit state methods.
- To use the above two methods for the design of Concrete beams and slabs under various conditions.
- To use the limit state method for design of a concrete staircase.
- Case studies and models wherever applicable.

## **UNIT I      DESIGN OF CONCRETE MEMBERS AND WORKING STRESS DESIGN OF BEAMS**

**12**

Concept of Elastic method, Ultimate Load Method and Limit State Method – Advantages of Limit State Method over other methods. Analysis and Design of Singly and Doubly reinforced rectangular and flanged beams for bending.



<b>UNIT II</b>	<b>LIMIT STATE DESIGN OF BEAMS</b>	<b>12</b>
Analysis and design of singly and doubly reinforced rectangular and flanged beams for Bending – Design of Continuous beams using IS code co-efficient.		
<b>UNIT III</b>	<b>LIMIT STATE DESIGN OF SLABS</b>	<b>7</b>
Behavior of one way and two way slabs – Design of one way and two way slabs for various edge conditions - Corner effects.		
<b>UNIT IV</b>	<b>DESIGN OF CIRCULAR SLABS</b>	<b>7</b>
Design of Simply supported and fixed Circular slabs subjected to uniformly distributed loads.		
<b>UNIT V</b>	<b>DESIGN OF STAIRCASE BY LIMIT STATE METHOD</b>	<b>7</b>
Types of Staircases – Design of Dog Legged Staircase.		

**TOTAL: 45 PERIODS**

#### **REQUIRED READING**

1. S.N. Sinha, Reinforced Concrete Design – Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1998.
2. Shah, Reinforced Concrete, Vol. 1 and 2 – Charotar Publishing House, Anand, 1998.

#### **REFERENCES:**

1. P. Dayaratnam, Design of Reinforced Concrete Structures, Oxford and IBH Publishing Co., 1983.
2. C. Sinha and S.K. Roy, Fundamentals of Reinforced Concrete, S.Chand & Co., New Delhi, 1983.
3. Dr. B.C. Punmia, Reinforced Concrete Structures, Vol, 1 & 2 Laxmi publication, Delhi, 2004.
4. IS 456:2000, Indian Standard, Plain and Reinforced Concrete – Code of Practice, Bureau of Indian Standards.
5. S. Unnikrishnan Pillai and Devados Menon, Reinforced Concrete Design – Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1999.

**AIM:**

To expose the students to the origin, development and spread of modern architecture in the Western world as well the architectural production of colonialism in India.

**OBJECTIVES:**

- To introduce the condition of modernity and bring out its impact in the realm of architecture
- To study modern architecture as evolving from specific aspects of modernity- industrialisation, urbanisation, material development, modern art as well as society's reaction to them.
- To study the further trajectories of modern architecture in the post WWII period.
- To create an overall understanding of the architectural developments in India influenced by colonial rule.

**CONTENT:****UNIT I LEADING TO A NEW ARCHITECTURE 9**

Beginnings of modernity –Origin and development of Neo Classicism- Structural Neo classicists: Laugier, Soufflot, Schinkel, Labrouste - Romantic Neo classicists: Ledoux, Boullé, Durand, Jefferson- Industrialization and its impact- Urbanization in Europe and America- split of design education into architecture and engineering streams- Emergent new building / space types- Growing need for mass housing- Development of Industrial material and construction technologies- concrete, glass and steel- structural engineering, standardization- Industrial exhibitions- Chicago School and skyscraper development.

**UNIT II REVIEWING INDUSTRIALISATION 6**

Opposition to industrial arts and production - Arts and Crafts in Europe and America : Morris, Webb- Art Nouveau: Horta, Van De Velde, Gaudi, Guimard, Mackintosh - Vienna secession: Hoffman, Olbrich- Wright's early works

**UNIT III MODERN ARCHITECTURE: DEVELOPMENT AND INSTITUTIONALISATION 12**

Adolf Loos and critique of ornamentation- Raumplan: Peter Behrens- Werkbund – Modern architecture and art - Expressionism: Mendelsohn, Taut, Polzeig- Futurism- Constructivism, Cubism-Suprematism- De–Stijl Bauhaus- Gropius, Meyer and Mies -CIAM I to X and its role in canonizing architecture- growth of International Style Ideas and works of Gropius, Le Corbusier, Aalto, Mies, later works of Wright

**UNIT IV MODERN ARCHITECTURE : LATER DIRECTIONS****8**

Post WW II developments and spread of international style – Later works of Corbusier: Brasilia, Unite- Works of later modernists: Louis Kahn, Paul Rudolph, Eero Saarinen, Philip Johnson

**UNIT V COLONIAL ARCHITECTURE IN INDIA****10**

Colonialism and its impact- early colonial architecture :forts, bungalows, cantonments – Stylistic transformations: Neo- classicism, Gothic Revival and Indo Saracenic - PWD and institutionalization of architecture - Building of New Delhi showcasing imperial power.

**TOTAL: 45 PERIODS****REQUIRED READING:**

1. Kenneth Frampton , Modern Architecture: A Critical History , Thames & Hudson, London, 1994.
2. Manfredo Tafuri., Modern Architecture, Harry N. Abrams Inc, 1976.
3. Leonardo Benevolo, History of Modern Architecture, 2 Vols.,Routledge & Keganpaul, London, 1971.
4. Miki Desai et. al., Architecture and independence, Oxford University Press,2000.

**REFERENCES:**

1. Thomas Metcalf, An imperial Vision, Faber & Faber/ Electa, 1980.
2. Christian Norburg Schulz., Meaning in Western Architecture, Studio Vista, 1975
3. William J. Curtis – Modern Architecture since 1900, Phaidon Press, 1982.

**AR8503****BUILDING SERVICES II****L T P/S C****2 0 2 3****AIM:**

To familiarize the students with building services that support the functioning of a building in the area of electrical wiring, lighting and conveying systems

**OBJECTIVES:**

- To inform the students of the laws and basics of electricity and wiring systems within domestic and commercial buildings
- To expose the students to the fundamentals of lighting and lighting design
- To familiarize the students to the basic design principle systems of vertical distributions systems within a building

- To expose the student with the NBC Code for all of the above building services

## **CONTENT:**

### **UNIT I ELECTRICAL AND ELECTRONIC SYSTEMS: ELECTRICAL WIRING SYSTEMS 10**

Laws of electrical circuits: Ohms and Kichoffs LawsBasics of electricity – Single/Three phase supply. Earthing for safety – types of earthing - ISI specifications Electrical wiring systems in domestic and commercial buildings. Conduits, Types of wiring Diagram for connection. Bus way, Bus Bars, lighting track and conduits (Aluminum metallic, non metallic) arrangements. Power handling, equipment, switch board, panel boards.Lighting conductors : Purpose, materials, fixing, earthing arrangements Electronic and Communication systems Communication and data systems- communication spaces, pathways, cabling systems, voice and data, communication, Electronic security systems, computer labs/server, Rooms etc. Electrical Installations in Buildings. Main and distribution boards – transformers – switch gears – substations – space requirement and Layout of the same in building types

### **UNIT II FUNDAMENTALS OF LIGHTING 12**

Principles of light – Electromagnetic radiation, waves, nature of vision, measurement of lighting. Principles of illumination: definitions, Visual tasks, Factors affecting visual tasks Units of light, definitions of flux, solid angle, luminous intensity –utilization factor – depreciation factor- MSCP – MHCP, brightness, glare.

### **UNIT III ILLUMINATION AND LIGHTING 8**

Electric light sources: brief description, characteristics and application of different types of lamps, methods of mounting and lighting control Luminaries classification/ - Lumen method for design – Room reflectance/ Glare – manufacturer’s data on luminaries / luminaries cost

### **UNIT IV LIGHTING DESIGN: INSTALLATION AND APPLICATION IN BUILDINGS 18**

Artificial light sources, spectral energy distribution, Luminous efficiency- color temperature – color rendering, Additive, subtractive color and their application areas and out door lighting Lighting for Office, Schools, Libraries, Residential, Hospital, Parking, Outdoor. Elementary ideas of special features required and minimum level of illumination for the physically handicapped and elderly in building types Solar energy systems for lighting – Photovoltaic systems for Residential/Commercial buildings. Reducing electric loads, installation and maintenance – LEED certification & energy efficient lighting, Lighting controls, Solar systems – Case studies and exercises involving in the above.

## **UNIT V CONVEYING SYSTEMS**

**12**

Basic design Principles, criteria for planning sizing, selection and layout of vertical distribution systems – ( lifts, Escalators and moving walkways) along with mechanical, dimensional details Elevators- types of elevators - design criteria, capacity, frequency, car size, speed, number and size of elevators, layout of banks of elevators, planning and locating service cores in buildings, types of elevators – pit, machine room details – NBC code Escalators and Conveyors parallel and criss cross escalators, horizontal belt conveyors, horizontal moving walkways – design criteria, speed size, capacity, number

Detailing for comfort, convenience of users- special features for physically handicapped and elderly - Case studies and exercises involving in the above.

**TOTAL: 60 PERIODS**

### **REQUIRED READINGS:**

1. E.P.Ambrose, Electric Heating, John Weley & Sons Inc., New York, 1968
2. Philips Lighting in Architectural Design, McGraw Hill. New York, 1964
3. R.G.Hopkenson & J.D.Kay, The lighting of Buildings, Faber & Faber, London, 1969
4. Elevators, Escalators , Moving Walkways – Manufactures catalogues John wiley, 1967
5. National Building Code, 2005

### **REFERENCES:**

Electrical Systems:

1. Handbook of building Engineers in metric systems, New Delhi 1968
2. National Building Code, 2005

**AR8504**

**SITE ANALYSIS AND PLANNING**

**L T P/S C**

**2 0 2 3**

### **AIM:**

To enable the appreciation of site and its elements and to equip students with techniques of site analysis as well as to introduce them to aspects of site planning.

### **OBJECTIVES:**

- To teach the importance of site and its content in architectural creations
- To orient the students towards several influencing factors which govern the siting of a

building or group of buildings in a given site.

- To teach various techniques of site analysis through exercises and case studies.
- To teach the students the methodology of preparing a site analysis diagram. This will serve as a prelude to any architectural creation through exercises.

## **CONTENT:**

### **UNIT I INTRODUCTION 8**

Definition of plot, site, land and region, units of measurements. Introduction to survey, methods of surveying, where they are used, Surveying Instruments and their application. Need for surveying. Measuring and drawing out a site plan from the measurements

### **UNIT II SITE DRAWINGS 12**

Computation of area by geometrical figures and other methods. Drawing marking out plan, layout plan and centerline plan – Importance, procedure for making these drawings and dimensioning. Setting out the building plan on site – Procedure and Precautions. Exercises on the above.

### **UNIT III SITE ANALYSIS 16**

Importance of site analysis; On site and off site factors; Analysis of natural, cultural and aesthetic factors – topography, hydrology, soils, vegetation, climate, surface drainage, accessibility, size and shape, infrastructures available - sources of water supply and means of disposal system, visual aspects; Preparation of site analysis diagram. Study of microclimate:- vegetation, landforms and water as modifiers of microclimate. Study of land form;- contours, slope analysis, grading process, grading criteria, functional and aesthetic considerations – Case studies and exercises on the above.

### **UNIT IV SITE CONTEXT 16**

Context of the site. Introduction to existing master plans land use for cities, development control Rules. Preparation of maps of matrix analysis & composite analysis. Site selection criteria for housing development, commercial and institutional projects - Case studies.

### **UNIT V SITE PLANNING AND SITE LAYOUT PRINCIPLES 8**

Organization of vehicular and pedestrian circulation, types of roads, hierarchy of roads, networks, road widths and parking, regulations. Turning radii & street intersections

**TOTAL: 60 PERIODS**

**REQUIRED READING:**

1. Kevin Lynch - Site planning - MIT Press, Cambridge, MA - 1984.
2. Edward. T. Q. Site Analysis – Architectural Media, 1983

**REFERENCES:**

1. B.C.Punmia - Surveying Vol.I - Standard Book House, New Delhi - 1983.
2. P.B.Shahani - Text of surveying Vol.I, Oxford and IBH Publishing Co – 1980
3. Joseph De.Chiarra and Lee Copleman - Urban Planning Design Criteria - Van Nostrand Reinhold Co., 1982
4. Storm Steven, Site engineering for landscape Architects, John wiley & Sons Inc, 2004.
5. Development Control Rules – CMDA, 2008

**AR8511****BUILDING CONSTRUCTION IV****L T P/S C****0 0 5 3****AIM:**

To provide an understanding of the various construction practices and details using steel and aluminum in the structural and non structural components of a building.

**OBJECTIVES:**

- To understand both in detail the methods of construction using steel for structural purposes such as roof trusses and roof covering.
- To understand both in detail the methods of construction of building components using steel such as staircases, rolling shutters, doors and windows.
- To understand both in detail the methods of construction of building components using aluminum such as doors and windows, partitions and curtain walling.
- To understand both in detail the methods of construction of building components using plastics such as doors and windows, partitions, roofs and curtain walling.
- To understand quality assurance measures and testing procedures related to material, workmanship and performance for the above topics.

**CONTENT:****UNIT I STEEL CONSTRUCTION INCLUDING STAIRCASES****25**

Design exercises using structural steel sections for walls, foundations, column-beam connections and design and detailing of steel roof trusses (north-light, butterfly truss, space





2. Alan Blanc, Stairs, Steps and Ramps, Butterworth, Heinemann Ltd., 1999
3. W.B. McKay, "Building Construction" Vol. 1 and 2, Longmans, UK, 1981.
4. Barry, Introduction to Construction of Buildings, Blackwell Publishing Ltd., Oxford, 2005
5. Barry, Introduction to Construction of Buildings Vol. 3, Blackwell Publishing Ltd., Oxford, 2005
6. Allan Brookes, Cladding of Buildings, E&FN Spon, London, 1998

**AR8512**

**ARCHITECTURAL DESIGN IV**

**L T P/S C**

**0 0 14 7**

**AIM:**

To explore the design of buildings addressing the socio – cultural & economic needs of contemporary urban society.

**OBJECTIVES:**

- To enable the students to understand the importance of spatial planning within the constraints of Development Regulations in force for urban areas.
- To enable the students to design for large groups of people in a socially and culturally sensitive manner, taking into account aspects such as user perception, crowd behaviour, large scale movement of people and identity of buildings.
- To emphasise on the importance of understanding the relationship between open space and built form, built form to built form and site planning principles involving landscaping circulation network and parking.
- To explore computer aided presentation techniques involving 2D and 3D drawings and models as required.

**CONTENT:**

Scale and Complexity: Buildings and small complexes that address the social and cultural needs of contemporary urban life (residential. Commercial, institutional) with a thrust on experiential qualities; multi bayed, multiple storied and circulation intensive; passive and active energy Areas of concern/ focus

- behavioral aspects and user satisfaction
- socio-cultural aspects
- designing for the differently abled
- Building byelaws and rules

- Appropriate materials and construction techniques
- Climatic design

Typology/ project: Housing Projects- detached, semi-detached, row housing, cluster housing, apartment; housing and facilities for other user groups- Old age Home, orphanage, working women's hostel, home for physically and mentally challenged; Museum/ Art centre, Educational campus, R & D centre, shopping complex

**TOTAL: 210 PERIODS**

### **REQUIRED READING**

1. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001.
2. Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library of Design, 1975
3. Joseph De Chiara, Julius Panero, Martin Zelnik, Time Saver Standards for Interior Design and Space Planning, McGraw Hill 2001.
4. Ernst Neuferts Architects Data, Blackwell 2002
5. Ramsey et al, Architectural Graphic Standards, Wiley 2000

### **REFERENCES**

1. Richard P. Dober, Campus Planning - Reinhold Book Corporation, 1963
2. Kanvinde, Campus design in India - American year Book, 1969
3. Kevin Lynch, Site planning, MIT Press, Cambridge, 1967
4. Sam F. Miller, Design Process: A Primer for Architectural and Interior Design, Van Nostrand Reinhold, 1995

**AR8601**

**DESIGN OF STRUCTURES III**

**L T P/S C**

**3 0 0 3**

### **AIM:**

The course is structured to teach the design of Reinforced concrete column, footings and retaining walls and to introduce the concept of pre-stressed concrete.

### **OBJECTIVES:**

- To use limit state design for the analysis and design of columns.
- To enable the learning of design of structural elements like footings, retaining walls and masonry walls.





## **UNIT V POST INDEPENDENT ARCHITECTURE IN INDIA**

**12**

Architectural debates associated with nation formation– early modernist architecture- post independence city planning: Chandigarh and Bhuvanewar- influences on post independence architects- Architecture of Kanvinde, Raje, Doshi, Correa, Nari Gandhi, Raj Rewal- PWD architecture – new directions after 1960s- post- independent architecture of Chennai

**TOTAL: 45 PERIODS**

### **REQUIRED READING:**

1. Kenneth Frampton , Modern Architecture: A Critical History , Thames & Hudson, London, 1994.
2. Diane Ghirardo , Architecture after Modernism, Thames & Hudson, London, 1990.
3. Miki Desai et. al., Architecture and independence, Oxford University Press,2000

### **REFERENCES:**

1. Christopher Alexander, Pattern Language, Oxford University Press, Oxford,1977
2. Robert Venturi , Complexity and Contradiction in Architecture, 1977.
3. Aldo Rossi, The Architecture of the City, MIT Press, Massachusetts, 1982.
4. Michael Hays ed., Architecture Theory since 1968, CBA, 1999
5. Jane Jacobs, Deaths and Life of Great American Cities, Vintage, 2003
6. James Steele, Hassan Fathy, Academy Editions, 1985
7. Kenneth Frampton ed, Charles Correa, The Perennial Press, 1998
8. William Jr. Curtis, Balkrishna Doshi, An Architecture for India, Rizzoli, 1988
9. Brian Brace Taylor, Geoffrey Bawa, Thames & Hudson, 1995

**AR8603**

**BUILDING SERVICES III**

**L T P/S C**

**2 0 2 3**

### **AIM:**

To familiarize the students with building services that support the functioning of a building in the area of internal environment control and fire and security and acoustics systems.

### **OBJECTIVES:**

- To expose the students to the science behind an air-conditioning and refrigeration system.
- To familiarize them with the various air- conditioning systems and their applications.

- To study the design issues for the selection of various systems and their installation
- To inform of the various ways by which fire safety design can be achieved in buildings through passive design.
- To familiarize the students with the various fire fighting equipment and their installation.
- To familiarize the students with the fundamentals of acoustics and principles in designing various built environment.

## **CONTENT:**

### **UNIT I AIR CONDITIONING: BASIC REFRIGERATION PRINCIPLES 4**

Thermodynamics – Heat – Temperature – Latent heat of fusion – evaporation, saturation temperature, pressure temperature relationship for liquid refrigerants – condensate cycle, air cycle, chilled water cycle and cooling water cycle – vapor compression cycle – compressors – evaporators – Refrigerant control devices – electric motors – Air handling Units – cooling towers

### **UNIT II AIR CONDITIONING: SYSTEMS AND APPLICATIONS 12**

Air conditioning system for small buildings – window types, evaporative cooler, packaged terminal units and through the wall units split system

b) Case for Central Plant – DX system – Chilled Water System – Air Cooled and Water Cooled condensers – Air Distribution system – VAV & VRV Systems – Low temperature applications - Configuring/ sizing of mechanical equipment, equipment spaces and sizes for chiller plant, cooling tower, Fan room, Circulation Pumps, Pipes, ducts – case studies.

### **UNIT III AIR CONDITIONING: DESIGN ISSUES AND HORIZONTAL DISTRIBUTION OF SYSTEMS 8**

Design criteria for selecting the Air conditioning system for large building and energy conservation measures - Typical choices for cooling systems for small and large buildings - Horizontal distribution of services for large buildings - Grouped horizontal distribution over central corridors, Above ceiling, In floor, Raised access floor, Horizontal distribution of mechanical services – case studies.

### **UNIT IV FIRE SAFETY: DESIGN AND GENERAL GUIDELINES OF EGRESS DESIGN - FIRE DETECTION AND FIRE FIGHTING AND INSTALLATION 24**

Principles of fire behavior, Fire safety design principles \_ NBC Planning considerations in buildings – Non- Combustible materials, egress systems, Exit Access – Distance between exits, exterior corridors – Maximum travel distance, Doors, Smoke proof enclosures General guidelines for egress design for Auditoriums, concert halls, theatres, other building types, window egress, accessibility for disabled- NBC guidelines – lifts lobbies, stairways, ramp design,

fire escapes and A/C, electrical systems – case studies Fire Detection and Fire Fighting: Heat smoke detectors – sprinkler systems -Fire fighting pump and water requirements, storage – wet risers, Dry rises -Fire extinguishers & cabinets -Fire protection system – CO2 & Halon system - Fire alarm system, snorkel ladder -Configuring, sizing and space requirements for fire fighting equipments.

## **UNIT V ACOUSTICS**

**12**

Fundamentals – Sound waves, frequency, intensity, wave length, measure of sound, decibel scale, speech and music frequencies, Reverberation time.

Acoustics and building design-site selection, shape volume, treatment for interior surfaces, basic principles in designing open air theatres, cinemas, broadcasting studios, concert halls, class rooms, lecture halls, schools, residences, office buildings including constructional measures and sound reinforcement systems for building types – case studies

**TOTAL: 60 PERIODS**

### **REQUIRED READINGS:**

1. William H. Severns and Julian R Fellows, Air conditioning and Refrigeration, John Wiley and Sons, London, 1988
2. Fire Safety: Ational Building Code of India 1983 published by Bureau of Indian Standards.
3. Dr. V. Narasimhan, An introduction to building physics, Kabir Printing works, Chennai-5, 1974.
4. David Egan, Concepts in Architectural Acoustics, 1972

### **REFERENCES:**

1. A.F.C. Sherratt, Air conditioning and Energy conservation, The Architectural Press, London, 1980
2. Design for fire safety (Andrew H Buchanan, John Wiley & Sons Ltd., New York)

**AR8611**

**ARCHITECTURAL DESIGN DEVELOPMENT**

**L T P/S C**

**0 0 6 3**

### **AIM:**

Learning of building construction will not realize its full objectives unless it is supplemented by a thorough understanding of how the architectural design is developed for proper execution

and the methods for achieving sound detailing. It is necessary for the students to understand the principles of detailing as applicable to various structural and non-structural situations in Indian context.

**OBJECTIVES:**

- To enable students to appreciate the various stages in which architectural drawings are prepared such as Concept Stage, Schematic / Preliminary Stage, Approval Stage, Design Development Stage, Tender Drawings & Documentation Stage and Construction Drawing Stage
- To enable students to appreciate the challenges in detailing for both the newly designed buildings as well as while carrying out additions and alterations to existing buildings.
- To enable students to understand the various Furniture, Fittings & Equipment (FFE) that are needed in buildings and their installation methods.
- To train students towards adopting an integrated approach while dealing with complex buildings incorporating various allied requirements.

**UNIT I            INTRODUCTION TO CURRENT DEVELOPMENTS IN BUILDING INDUSTRY            10**

Smart Materials: Characteristics, classification, properties, energy behaviour, intelligent environments. Recycled and ecological materials and energy saving materials: Straw-bale, card board, earth-sheltered structures, recycled plastics, recycled tyres, paper-crete, sandbags, photovoltaic, solar collectors, light-pipes, wind catchers - Exercises of the above through case studies and drawings.

**UNIT II            DETAILING OF WALLS, ROOFS AND FLOORING FOR INSTITUTIONAL BUILDINGS            20**

- a) Detailing of a residence - selected spaces.
- b) Detailing of classrooms, library (in school, college)
- c) Detailing of lecture hall, auditorium, exhibition spaces
- d) Detailing relevant to a small industrial structure showing wall cladding, insulated roofing, gantry support, floor trenches and industrial doors - Exercises of the above through case studies and drawings

**UNIT III            DETAILING OF WALLS, ROOF, FLOORING FOR COMMERCIAL BUILDINGS            20**

- a) Detailing of shop-fronts, office spaces for commercial buildings including detailing of crucial elements such as entrance porches, main doors, staircases, show-windows, enclosed and air-conditioned atrium spaces.





**AIM:**

To explore the design and form of building typologies that are the result of pressure on urban lands with a thrust on issues like urban land economics, technology and ecology.

**OBJECTIVES:**

- To create an awareness with regard to the design of green buildings and sustainable architecture.
- To inculcate the importance of services integration and construction in spatial planning in the context of design of High-rise buildings and service intensive buildings.
- To highlight on the importance of High rise buildings as elements of identity in urban areas and urban design principles that govern their design.
- To explore computer aided presentation techniques involving 2D and 3D drawings, walk through and models as required.

**CONTENT:**

Scale and Complexity: Advanced and complex problems involving large scale Multi-storeyed buildings and complexes for Residential/ Commercial/ Institutional/ Mixed-Use in an urban context with focus on visual characteristics, service integration and sustainable practices.

Areas of focus/ issues:

- sustainable building practices, green issues, alternative energy
- intelligent building techniques and service integration
- Architectural Detailing
- Advanced building practices

Typology/ project: office building, multi-use centre, convention center, multiplex, corporate complex, health care and hospitality building

**REQUIRED READING:**

1. Joseph De Chiara, Michael J. Crosbie, Time Savers Standards for Building Types, McGraw Hill Professional 2001.
2. Ernst Newforts Architects Data, Blackwell 2002.
3. National Building Code of India, Vol 1-5, 2005.

4. Sustainable Design, Ecology, Architecture & Planning, Daniel Williams, John Wilay & sons Inc, NJ, 2007.

#### **REFERENCES:**

1. Kevin Lynch, Site Planning, MIT Press, Cambridge, 1967
2. Mili Mazumdar, Energy Efficient Buildings in India, TERI, New Delhi, 2012
3. SPACE Shopping mall, Diane Tsang, 2011
4. Campus Architecture : Building in the groves of academe, Richard P. Dober, Mc Graw Hill, 1996.
5. Office - Architecture + Design, Lara Menzel, Braua Publishers 2009.
6. Prefabulous + Sustainable, Building and Customizing an affordable, Energy efficient home, Sheri Koonen, ABRAMS, 2010.

**TOTAL: 210 PERIODS**

**AR8701**

**SPECIFICATIONS AND ESTIMATION**

**L T P/S C**

**3 0 0 3**

#### **AIM:**

To enable students understand the method of writing specifications for the various items of works involved in the building to expose him / her the procedure involved in estimating quantities of materials and works, various costs involved, various financial institutions and to prepare feasibility report of a project – simple projects will be introduced for preparation of specification and estimates.

#### **OBJECTIVES:**

- To inform to students the need and importance of specification, how to write specification – important aspects of the design of a specification.
- To inform to students the need for estimation the concept of abstract and detailed estimates based on measurement of materials and works.
- To inform to students about cost control and about valuation and depreciation

#### **UNIT I SPECIFICATION**

**7**

Necessity of specification, importance of specification, - How to write specification, - Types of Specification, -Principles of Specification writing, - Important aspects of the design of specification – sources of information – Classification of Specification.

**UNIT II SPECIFICATION WRITING 10**

Brief Specification for 1<sup>st</sup> class, 2<sup>nd</sup> class , 3<sup>rd</sup> class building. Detailed specification for earthwork excavation, plain cement concrete, Reinforced concrete, first class and second class brickwork, Damp proof course, ceramic tiles/marble flooring and dadoo, woodwork for doors, windows frames and shutters, cement plastering, painting & weathering course in terrace.

**UNIT III ESTIMATION 10**

Types & purpose, Approximate estimate of buildings – Bill of quality, factors to be considered, - principles of measurement and billing, contingencies, measurement of basic materials like brick, wood, concrete and unit of measurement for various items of work – abstract of an estimate.

**UNIT IV DETAILED ESTIMATE 10**

Deriving detailed quantity estimates for various items of work of a building. Like earthwork excavation, brick work, plain cement concrete, Reinforced cement concrete works, wood work, iron works, plastering, painting, flooring, weathering course for a single storied building.

**UNIT V CURRENT TRENDS 8**

Methods of contracting and its link to specification drafting - the Business Environment and the structure in practice. Valuation, depreciation and its implications – case studies.

**TOTAL: 45 PERIODS**

**REQUIRED BOOKS:**

- Estimating, Costing and Valuation(Professional practice) By Rangwala – S.C, 1984
- CHAROTAR PUBLISHING HOUSE, INDIA.

**REFERENCES**

1. Estimating & Costing – By B.W. Dutta (Revised by S. Dutta) UBS Publishers Distribution P.Ltd. India, 1983
2. Estimating Costing and Specification. – By M. Chakraborti, 1984
3. Estimating Costing and Valuation – By Gurcharan singh & Jagdish singh. Standard Publishers Distributors, 1705 – B, Nai sark post box no.1066. Delhi – 110 006.
4. T.N. Building practice, Vol:1 Civil Govt Publication.
5. PWD Standard Specifications. Govt Publication.

**AIM:**

To provide an overview of the vocabulary of Human settlements, while looking at planning concepts and processes in urban and regional planning and urban renewal and contemporary urban planning issues.

**OBJECTIVES:**

- To introduce the elements of Human settlements and the classification of Human settlements.
- To outline the form and structure of settlements and illustrating through case studies.
- To familiarize the students with modern concepts of Settlement Planning.
- To outline the scope and content of Urban planning, Urban renewal and Regional planning and the various plans to be prepared.
- To exposes the students to some of the issues in contemporary urban planning in India.

**CONTENTS:****UNIT I INTRODUCTION 9**

Elements of Human Settlements – human beings and settlements – nature shells & Net work – their functions and Linkages – Anatomy & classification of Human settlements – Locational, Resource based, Population size & Occupational structure.

**UNIT II FORMS OF HUMAN SETTLEMENTS 9**

Structure and form of Human settlements – Linear, non-linear and circular –Combinations – reasons for development – advantages and disadvantages – case studies – factors influencing the growth and decay of human settlements.

**UNIT III PLANNING CONCEPTS 9**

Planning concepts and their relevance to Indian Planning practice in respect of Ebenezer Howard – Garden city concepts and contents – Patrick Geddes – Conservative surgery – case study – C.A. Perry – Neighborhood concept Le Corbusier – concept and case studies.

**UNIT IV URBAN PLANNING AND URBAN RENEWAL 9**

Scope and Content of Master plan – planning area, land use plan and Zoning regulations – zonal plan – need, linkage to master plan and land use plan – planned unit development

(PUD) – need, applicability and development regulations - Urban Renewal Plan – Meaning, Redevelopment, Rehabilitation and Conservation – JNNURM – case studies.

**UNIT V ISSUES IN CONTEMPORARY URBAN PLANNING IN INDIA 9**

Globalization and its impact on cities – Urbanisation, emergence of new forms of developments – self sustained communities – SEZ – transit development – integrated townships – case studies.

**TOTAL: 45 PERIODS**

**REQUIRED READING:**

1. C.L.Doxiadis, Ekistics, 'An Introduction to the Science of Human Settlements', Hutchinson, London, 1968.
2. Andro D.Thomas, 'Housing and Urban Renewal, George Allen and Unwin, Sydney, 1986.
3. Ministry of Urban Affairs and Employment, Government of India, New Delhi, 'Urban Development Plans: Formulation & Implementation' - Guidelines - 1996.

**REFERENCES:**

1. Madras Metropolitan Development Authority, 'Master Plan for Madras Metropolitan Area, Second Master Plan - 1995.
2. Government of India, 'Report of the National Commission on Urbanisation', 1988.
3. Hansen N., 'Regional Policy and Regional Integration' Edward Elgar, UK, 1996.
4. Centre for Human Settlements, Anna University, Chennai 'Development Plan for Uthokottai Taluk, Cheyyur Taluk', 1999.

**AR 8703**

**PROFESSIONAL PRACTICE AND ETHICS**

**L T P/S C**

**3 0 0 3**

**AIM:**

To provide the students a general understanding of architectural profession, importance of ethics and code of conduct and expose them towards issues concerning architectural practice such as scale of Fees, Competitions, Tendering, Contracting, Legal aspects and the current trends in professional practice.

**OBJECTIVES:**

- To give an introduction to the students about the architectural profession and the role of professional bodies and statutory bodies.

- To teach the students about the importance of code of conduct and ethics in professional practice and the mandatory provisions as per Architects Act 1972.
- To expose the students some of the important legal aspects and legislations which have a bearing on the practice of architectural profession.
- To enable the students to grasp the advanced issues concerning professional practice such as tendering, contracting including alternative practices in project execution and project management.
- To expose the students to the implications of globalisation on professional practice with particular reference to WTO and GATS and equip them for international practice.

## **CONTENT:**

### **UNIT I INTRODUCTION TO ARCHITECTURAL PROFESSION CODE OF CONDUCT AND ETHICS 9**

Importance of Architectural Profession – Role of Architects in Society – Registration of Architects – Architect’s office and its management – Location, organisational structure - Infrastructure requirement, skills required, elementary accounts – Tax liabilities.

Role of Indian Institute of Architects – Architects Act 1972 (intent, objectives, provisions with regard to architectural practice) – Council of Architecture (role and functions) – Importance of ethics in professional practice – Code of conduct for architects, punitive action for professional misconduct of an architect.

### **UNIT II ARCHITECT’S SERVICES, SCALE OF FEES & COMPETITIONS 9**

Mode of engaging an architect – Comprehensive services, partial services and specialised services – Scope of work of an architect – Schedule of services – Scale of fees (Council of Architecture norms) – Mode of payment – Terms and conditions of engagement – Letter of appointment.

Importance of Architectural competitions – Types of competitions (open, limited, ideas competition) – Single and two stage competitions – Council of Architecture guidelines for conducting Architectural competitions – National and International Competitions - Case studies.

### **UNIT III TENDER & CONTRACT 12**

Tender -Definition - Types of Tenders - Open and closed tenders - Conditions of tender – Tender Notice - Tender documents - Concept of EMD - Submission of tender - Tender scrutiny - Tender analysis – Recommendations – Work order - E-tendering (advantages, procedure, conditions).

Contract – Definition - Contract agreement - its necessity – Contents (Articles of Agreement, Terms and Conditions, Bills of Quantities and specifications, Appendix) – Certification of Contractors Bills at various stages.

New trends in project formulation and different types of execution (BOT, DBOT, BOLT, BOO, etc.) - Execution of projects – The process (Expression of interest, Request for Proposal, Mode of Evaluation of Bids, Award of work)

#### **UNIT IV    LEGAL ASPECTS**

**6**

Arbitration (Definition, Advantages of arbitration, Sole and joint arbitrators, Role of umpires, Award, Conduct of arbitration proceedings) – Arbitration clause in contract agreement (role of architect, excepted matters)

Easement – (meaning, types of easements, acquisition, extinction and protection)

Copy rights and patenting – (provisions of copy right acts in India and abroad, copy right in architectural profession)

Consumer Protection Act (Intent, Architects responsibility towards his clients)

#### **UNIT V    IMPORTANT LEGISLATIONS AND CURRENT TRENDS**

**9**

Development Regulations in Second Master Plan for CMA, Chennai Corporation Building Rules 1972 - Factories Act – Persons with Disabilities Act – Barrier Free Environment - Coastal Regulation Zone – Heritage Act.

Globalisation and its impact on architectural profession – Preparedness for International practice – Entry of Foreign architects in India – Information Technology and its impact on architectural practice.

Emerging specialisations in the field of Architecture – Architect as construction / Project manager – Architectural journalism – Architectural photography.

**TOTAL: 45 PERIODS**

#### **REQUIRED READING:**

1. Architects Act 1972.
1. Publications of Handbook on Professional practice by IIA.
2. Publications of Council of Architecture-Architects (Professional conduct) Regulations 1989, Architectural Competition guidelines
3. Roshan Namavati, Professional practice, Lakhani Book Depot, Mumbai 1984.
4. Ar. V.S. Apte, Architectural Practice and Procedure, Mrs. Padmaja Bhide, 2008



## REFERENCES:

1. J.J.Scott, Architect's Practice, Butterworth, London 1985.
2. Development Regulations of Second Master Plan for Chennai Metropolitan Area -2026.
3. Chennai City Corporation Building Rules 1972.
4. T.N.D.M. Buildings rules, 1972.
5. Consumer Protection Act, 1986
6. Arbitration Act, 1996
7. Maharashtra Regional and Town Planning and Development (Amendment) Act, 1994
8. Factories Act, 1948
9. Persons with Disabilities Act, 1995

**AR8704**

**URBAN DESIGN**

**L T P/S C**

**2 0 2 3**

## AIM:

To understand the continuity of built environment from the macro to the micro scale as well as to make aware of the discipline of urban design

## OBJECTIVES:

- To understand the scope and nature of urban design as a discipline
- To introduce the components of a city and their interdependent roles.
- To understand the evolution of historic urban form
- To learn to interpret the city in different ways and layers.
- To create awareness of contemporary urban issues as well as learn about possible ways to address them

## CONTENT:

### **UNIT I INTRODUCTION TO URBAN DESIGN**

**8**

Components of urban space and their interdependencies- outline of issues/ aspects of urban space and articulation of need for urban design- scope and objectives of urban design as a discipline

### **UNIT II HISTORIC URBAN FORM**

**12**

Western: morphology of early cities- Greek agora- Roman forum- Medieval towns- Renaissance place making- ideal cities – Industrialization and city growth- the eighteenth

century city builders Garnier's industrial city- the American grid planning- anti urbanism and the picturesque- cite industrielle- citte nuovo-radiant city .

Indian: evolution of urbanism in India- Temple towns- Mughal city form- medieval cities - colonial urbanism- urban spaces in modernist cities: Chandigarh, Bhuvaneshwar and Gandhi Nagar- subsequent directions – case studies.

**UNIT III THEORISING AND READING URBAN SPACE 8**

Ideas of Imageability and townscape: Cullen, Lynch- place and genius loci- collective memory- historic reading of the city and its artefacts: Rossi- social aspects of urban space: life on streets and between buildings, gender and class, Jane Jacobs, William Whyte

**UNIT IV ISSUES OF URBAN SPACE 20**

Understanding and interpreting of urban problems/ issues- place-making and identity, morphology: sprawl, generic form, incoherence, privatized public realm- effects/ role of real estate, transportation, zoning, globalisation - ideas of sustainability, heritage, conservation and renewal- contemporary approaches : idea of urban catalyst, transit metropolis, community participation – studio exercise involving the above.

**UNIT V BEST PRACTICE IN URBAN DESIGN 12**

Contemporary case studies from developing and developed economies that offer design guidelines and solutions to address various issues/ aspects of urban space – case studies.

**TOTAL: 60 PERIODS**

**REQUIRED READING:**

1. A.E.J. Morris, History of Urban Form before the Industrial Revolution, Prentice Hall 1996
2. Edmund Bacon , Design of Cities , Penguin, 1976
3. Gordon Cullen, The Concise Townscape, The Architectural Press, 1978
4. Michelle Provoost et al., Dutchtown, NAI Publishers, Rotterdam, 1999
5. Time Saver Standards for Urban Design, Donald natson, McGraw Hill, 2003.
6. Kevin Lynch, Image of the City, 1960 MIT Press
7. Rithchie. A, Sustainable Urban Design: A Environmental Approach, Taylor – Francis, 2000.

**REFERENCES:**

1. Jonathan Barnett, An Introduction to Urban Design, Harper Row, 1982
2. Lawrence Halprin, Cities, Reinhold Publishing Corporation, New York, 1964

3. Gosling and Maitland, Urban Design, St. Martin's Press, 1984
4. Urban Design Futures, Molcolm Moor, Routledge, 2006
5. Geoffrey Broadbent, Emerging Concepts in Urban Space Design

**AR8711**

**ARCHITECTURAL DESIGN VI**

**L T P/S C**  
**0 0 16 8**

**AIM:**

To explore the continuity and dynamics of urban form with a thrust on the interrelationships between the disciplines of architecture, urban design and town planning

**OBJECTIVES:**

- To understand the various components and aspects of the urban environment as well as their interrelationships
- To understand in specific components/issues such as public spaces, physical infrastructure, socio-cultural aspects- heritage, gender, class, dynamics of urban growth
- To understand people as users of the urban environment in various scales.
- To explore techniques of mapping and diagramming to understand the dynamic urban environment.
- To take design decisions in a comprehensive manner understanding their implications in the larger context.

**CONTENT:**

Scale and Complexity: projects involving the urban context and architecture in the urban context with a thrust on understanding interdependencies and formulating appropriate design directions.

Areas of focus/ issues:

- exploration of relationship between building and larger context
- contemporary processes in design
- appropriate architecture
- addressing issues in urban areas – transportation, sustainability, heritage, sprawl, place making, identity, collective memory
- Mixed use programming

Typology/ project: those involving large scale urban interventions as well as large scale projects which have impact on the urban context- revitalization and renewal of urban fragments, evolving

guidelines for heritage areas, adaptive reuse, urban waterfront development, transportation nodes, new communities, multi-use urban complexes.

**TOTAL: 240 PERIODS**

**REQUIRED READING:**

1. Jonathan Barnett, An Introduction to Urban Design
2. Michelle Provoost et al., Dutchtown, NAI Publishers, Rotterdam, 1999.
3. I. Jawgeih, Life between Buildings,- Using Public Space, Arkitektens Forleg 1987.
4. Time Savers Standard for Urban Design, Donald Watson, McGraw Hill, 2005.
5. Urban design Futures, Malcolm moor, Routledge, 2006.

**REFERENCES:**

1. Edmund Bacon , Design of Cities , Penguin, 1976
2. Gordon Cullen, The Concise Townscape, The Architectural Press, 1978
3. Lawrence Halprin, Cities, Reinhold Publishing Corporation, New York, 1964
4. Gosling and Maitland, Urban Design, St. Martin's Press, 1984
5. Kevin Lynch, Site Planning, MIT Press, Cambridge 1967

**AR8811**

**THESIS**

**L T P/S C  
0 0 34 17**

**OBJECTIVES:**

All the architectural design courses offered since semester II culminate in the thesis Project to motivate students to involve in individual research and methodology. This is to train them in handling projects independently.

**TOPICS OF STUDY**

The main areas of study and research can include advanced architectural design, including contemporary design processes, urban design including urban-infill, environmental design, conservation and heritage precincts, housing etc. However, the specific thrust should be architectural design of built environment. Preparation of presentation drawings, working drawings, detailed drawings and study model are part of the requirements for submission.

**METHOD OF SUBMISSION**

The Thesis Project shall be submitted in the form of drawings, project report, models, slides, CDs and reports.

**TOTAL: 510 PERIODS**

**REQUIRED READING:**

- Linda Grant and David Wang, Architectural Research Methods, John Wiley Sons, 2002

**REFERENCES:**

1. Donald Appleyard, The Conservation of European Cities, M.I.T. Press, Massachusetts, 1979.
2. Michelle Provoost et al., Dutchtown, NAI Publishers, Rotterdam, 1999
3. Richard Kintermann and Robert small site planning for cluster Housing van nastrand reinhold company, Jondon/New York 1977.
4. Miller T.G. Jr., Environmental Sciences, Wadsworth Publishing Co. (TB)
5. Kevin Lynch - Site planning - MIT Press, Cambridge, MA - 1967.
6. Geoffrey And Susan Jellicoe, The Landscape of Man, Thames And Hudson, 1987.
7. Arvind Krishnan & Others, Climate Responsive Architecture, A Design Handbook for Energy Efficient Buildings, TATA McGraw Hill Publishing Company Limited, New Delhi, 2007

**AR8911****PRACTICAL TRAINING - I****L T P/S C****X X X 10****AIM:**

To expose students to the daily realities of an architectural practice through two semesters of Practical Training of which Practical Training – I is to take place during semester IX.

**OBJECTIVES:**

- To facilitate an understanding of the evolution of an architectural project from design to execution.
- To enable an orientation that would include the process of development of conceptual ideas, presentation skills, involvement in office discussions, client meetings, development of the concepts into working drawings, tendering procedure, site supervision during execution and coordination with the agencies involved in the construction process.

The Practical Training -I would be done in offices / firms in India empanelled by the Institution in which the principal architect is registered under the Council of Architecture.

The progress of practical training shall be assessed internally through submission of log books supported by visual documents maintained by students every month along with the progress report from the employer/s of trainees.

The students would be evaluated based on the following criteria:

1. Adherence to time schedule, Discipline.
2. Ability to carry out the instructions on preparation of schematic drawings, presentation drawings, working drawings.
3. Ability to work as part of a team in an office.
4. Ability to participate in client meetings and discussions.
5. Involvement in supervision at project site.

At the end of the Practical Training -I, a portfolio of work done during the period of Practical Training along with certification from the offices are to be submitted for evaluation by a viva voce examination. This will evaluate the understanding of the students about the drawings, detailing, materials, construction method and service integration and the knowledge gained during client meetings, consultant meetings and site visits.

**TOTAL: 15 WEEKS**

**AR8081**

**DISSERTATION**

**L T P/S C**

**X X X 3**

Design studio emphasize on explaining and understanding Architecture primarily through the mode of making. Dissertation offers an opportunity to look at architecture, history and design primarily through textual. However, like design, dissertation involves process of observation, reflection and abstraction. Students are encouraged to choose any topic of their interest during the Practical Training -I undertaken by the student in IX semester and obtain approval from the Department before commencement of the Practical Training-II at the X semester.

The dissertation proposal in about 1500 words stating the topic, issues to be explored and the scope must be submitted before the commencement of Practical Training II for the approval of the department. The topic chosen may range from analyzing the works of an architect, history, typological changes, writing, design process and many more. After approval the work would be reviewed atleast twice during the semester by the department. Students are advised to seek the guidance of the architects under whom they go through the Practical Training II.

The final dissertation report shall contain objectives, followed by exhaustive documentation and arguments. The emphasis however, could vary according to the topic. A well written report of a minimum 15,000 words must be submitted in the prescribed format, if any provided by the University. The student would subsequently make a presentation of his/her work and appear for the Viva voce examination to be conducted at the end of Practical Training II.

**TOTAL: 15 WEEKS**

## REFERENCES

1. Ian Border, Kurt Rueideu, The Dissertation, An Architectural Students Hand Book, Architectural Press, 2000
1. Linda Grant and David Wang, Architectural Research Methods, John Wiley Sons, 2002

**AR8082**

**PRACTICAL TRAINING - II**

**L T P/S C**

**X X X 10**

### **AIM:**

To strengthen further the understanding of students to the nuances of architectural practice as a continuation of Practical Training -I done during semester IX.

### **OBJECTIVES:**

- To facilitate an understanding of the evolution of an architectural project from design to execution.
- To enable an orientation that would include the process of development of conceptual ideas, presentation skills, involvement in office discussions, client meetings, development of the concepts into working drawings, tendering procedure, site supervision during execution and coordination with the agencies involved in the construction process.

The Practical Training -II would be done in offices / firms in India empanelled by the Institution in which the principal architect is registered with the Council of Architecture if the firm is in India or in an internationally reputed firm established abroad.

The progress of practical training shall be assessed internally through submission of log books supported by visual documents maintained by students every month along with the progress report from the employer/s of trainees.

The students would be evaluated based on the following criteria:

1. Adherence to time schedule, Discipline.
2. Ability to carry out the instructions on preparation of schematic drawings, presentation drawings, working drawings.
3. Ability to work as part of a team in an office.
4. Ability to participate in client meetings and discussions.
5. Involvement in supervision at project site.

At the end of the Practical Training -II a portfolio of work done during the period of internship along with certification from the offices are to be submitted for evaluation by a viva voce examination. This will evaluate the understanding of the students about the drawings, detailing, materials, construction method and service integration and the knowledge gained during client meetings, consultant meetings and site visits.

**TOTAL: 15 WEEKS**

**AR8001**

**ART APPRECIATION**

**L T P/S C**

**3 0 0 3**

**AIM:**

The objective of the course is to understand and appreciate art in terms of its form, content and context through the study of works of art over history in order to develop a sensitivity towards aesthetics which is a necessary component of architecture.

**OBJECTIVES:**

- To introduce the vocabulary of art and the principles.
- To inform students about the various art forms through the ages within the cultural contexts.
- To study Modern Art and the new directions that evolved in the 19th and 20th centuries.
- To inform the production of art in the Indian context through history and the contemporary manifestations.

**CONTENT:**

**UNIT I INTRODUCTION TO ART**

**6**

Definition of art - need for art – role of art – art reality, perception, representation- categories of art in terms of media and technique - appreciating art: form, content and context

**UNIT II VOCABULARY OF ART**

**8**

Introducing the vocabulary of art constituted by elements (line, shape, form, space, colour, light, value, texture) and principles (unity, variety, harmony, rhythm, balance, proportion, emphasis, contrast, movement)

**UNIT III APPRECIATING ART – BEGINNINGS TO MODERN ART**

**12**

Appreciating art through the study of art production in the West from the beginnings to the birth of modern art. Important works from the following art traditions will be studied and analysed in terms of their form, content and context



Prehistoric Art - Egyptian and Mesopotamian art Greek and Roman art– Medieval art - Renaissance and Baroque art - Neoclassicism - Romanticism - Realism

**UNIT IV APPRECIATING ART- MODERN ART AND AFTER 10**

Appreciating art through the study of art production in the West over history from modern art till the present. Important works from the following art traditions will be studied and analysed in terms of their form, content and context :

Context for new directions in art in the late 19<sup>th</sup> and early 20<sup>th</sup> century - Impressionism - post Impressionism – Fauvism- Expressionism- Cubism – Dadaism – Surrealism - abstract art – Futurism - Constructivism – Suprematism — De Stijl - Abstract Expressionism - Pop art - Op art- new forms and media of art

**UNIT V APPRECIATING ART- INDIAN ART 9**

Appreciating art through the study of art production in India over history. Important works from the following art traditions will be studied and analysed in terms of their form, content and context

Indus Valley Art - Hindu Buddhist and Jain art - Mughal and Rajput miniatures - art during the colonial period - modern Indian Art.

**TOTAL :45 PERIODS**

**REQUIRED READING**

1. Fred, S. Kleiner, Gardner's Art through Ages, Harcourt College Publishers, 2001
2. Bernard S. Myers, Understanding the Arts, Holt, Rinehart and Winston Inc, 1964
3. Edith Thomory- a History of Fine Arts in India and the West, Orient Longman Publisher's Pvt. Ltd, New Delhi
4. H.H. Arnason, History of Modern Art, Thames and Hudson, 1977

**REFERENCES:**

1. The Penguin Dictionary of Art and Artists - Peter and Linda Murray - Penguin books 1989.
2. E.H. Gombrich, The Story of Art, Phaidon 2002
3. E.H. Gombrich, Art and Illusion, Phaidon, 2002
4. Indian Art since the early 1940s- A Search for Identity- Artists Handicrafts Association of Cholamandal Artists Village, Madras, 1974
5. A.K. Coomaraswamy, Fundamentals of Indian Art, Historical Research Documentation Programme, Jaipur, 1985

**AIM:**

To provide basic knowledge of earthquake resistant design concepts to students of Architecture, as it has become evident in recent years that some of the seismically active areas of the world are located within Indian and lives lost during past earthquakes due to damage of homes and other buildings are enormous.

**OBJECTIVES:**

- To understand the fundamentals of Earthquake and the basic terminology
- To inform the performance of ground and buildings.
- To familiarise the students with design codes and building configuration
- To understand the various types of construction details to be adopted in a seismic prone area.
- To apply the knowledge gained in an architectural design assignment

**CONTENT:****UNIT I****7**

Fundamentals of earthquakes

- a) Earth's structure, seismic waves, plate tectonics theory, origin of continents, seismic zones in India.
- b) Predictability, intensity and measurement of earthquake
- c) Basic terms- fault line, focus, epicentre, focal depth etc.

**UNIT II****8**

Site planning, performance of ground and buildings

- a) Historical experience, site selection and development
- b) Earthquake effects on ground, soil rupture, liquefaction, landslides.
- c) Behaviour of various types of building structures, equipments, lifelines, collapse patterns

d) Behaviour of non-structural elements like services, fixtures in earthquake-prone zones

### **UNIT III**

**8**

Seismic design codes and building configuration

- a) Seismic design code provisions – Introduction to Indian codes
- b) Building configuration- scale of building, size and horizontal and vertical plane, building proportions, symmetry of building- torsion, re-entrant corners, irregularities in buildings-like short stories, short columns etc.

### **UNIT IV**

**10**

Various types of construction details

- a) Seismic design and detailing of non-engineered construction- masonry structures, wood structures, earthen structures.
- b) Seismic design and detailing of RC and steel buildings
- c) Design of non-structural elements- Architectural elements, water supply, drainage, electrical and mechanical components

### **UNIT V**

**12**

Urban planning and design

- a) Vulnerability of existing buildings, facilities planning, fires after earthquake, socio-economic impact after earthquakes.
- b) Architectural design assignment- Institutional masonry building with horizontal spread and height restriction, multi-storeyed RC framed apartment or commercial building .

**TOTAL: 45 PERIODS**

### **REQUIRED READING:**

1. Guidelines for earthquake resistant non-engineered construction, National Information centre of earthquake engineering (NICEE, IIT Kanpur, India)
2. C.V.R Murthy, Andrew Charlson. "Earthquake design concepts", NICEE, IIT Kanpur India.
3. Agarwal.P, Earthquake Resistant Design, Prentice Hall of India, 2006.

## REFERENCES

1. Ian Davis (1987) "Safe shelter within unsafe cities" Disaster vulnerability and rapid urbanisation, Open House International, UK
2. Socio-economic developmental record- Vol.12, No.1, Jan-Feb 2005
3. Learning from Practice- A review of Architectural design and construction experience after recent earthquakes- Joint USA-Italy workshop, Oct.18-23, 1992, Orvieto, Italy.

**AR8003**

**ENERGY EFFICIENT ARCHITECTURE**

**L T P/S C**

**3 0 0 3**

### AIM:

In the face of a crisis of depleting resources the aim is to familiarize the student with passive design consideration and the use of non renewable sources of energy in buildings.

### OBJECTIVES:

- To inform the need to use alternative sources of energy in view of the depleting resources and climate change.
- To familiarise the students with simple and passive design considerations
- To inform about the importance of day lighting and natural ventilation in building design
- To make the students aware of the future trends in creating sustainable built environment.

### UNIT I PASSIVE DESIGN

**10**

Significance of Energy Efficiency in the contemporary context, Simple passive design considerations involving Site Conditions, Building Orientation, Plan form and Building Envelope - Heat transfer and Thermal Performance of Walls and Roofs

### UNIT II ADVANCED PASSIVE ARCHITECTURE- PASSIVE HEATING

**10**

Direct Gain Thermal Storage of Wall and Roof - Roof Radiation Trap - Solarium - Isolated Gain

### UNIT III PASSIVE COOLING

**8**

Evaporative Cooling - Nocturnal Radiation cooling - Passive Desiccant Cooling - Induced Ventilation - Earth Sheltering - Wind Tower - Earth Air Tunnels

### UNIT IV DAY LIGHTING AND NATURAL VENTILATION

**5**

Daylight Factor - Daylight Analysis - Daylight and Shading Devices - Types of Ventilation - Ventilation and Building Design.

## **UNIT V CONTEMPORARY AND FUTURE TRENDS**

**12**

Areas for innovation in improving energy efficiency such as Photo Voltaic Cells, Battery Technology, Thermal Energy Storage, Recycled and Reusable Building materials, Nanotechnology, smart materials and the future of built environment, Energy Conservation Building code.

**TOTAL: 45 PERIODS**

### **REQUIRED READING:**

1. Manual on Solar Passive Architecture, IIT Mumbai and Mines New Delhi - 1999
2. Arvind Krishnan & Others, Climate Responsive Architecture, A Design Handbook for Energy Efficient Buildings, TATA McGraw Hill Publishing Company Limited, New Delhi, 2001
3. Majumdar M, Energy Efficient Building in India, TERI, 2000.

### **REFERENCES:**

1. Fuller Moore, Environmental Control Systems, McGraw Hill INC, New Delhi - 1993
2. Sophia and Stefan Behling, Solpower, the Evolution of Solar Architecture, Prestel, New York, 1996
3. Givoni .B, Passive and Low Energy Cooling of Buildings, Van Nostrand Reinhold, New York, 1994
4. The energy efficient home: a complete guide by Patrick Waterfield, Crowood press Ltd.
5. Dean Hawkes, Energy Efficient Buildings: Architecture, Engineering and Environment, W.W. Norton & Company
6. David Johnson, Scott Gibson, Green from the Ground Up: Sustainable, Healthy and Energy efficient home construction, Published April 2008 by Tauton.

**AR8004**

**EVOLUTION OF HUMAN SETTLEMENTS**

**L T P/S C**

**3 0 0 3**

### **AIM:**

To enable the understanding of the factors that led to the growth of settlements and the changing scenario in the contemporary world.

### **OBJECTIVES:**

- To outline the origins of human settlements and its determinants and their evolution through the course of history.

- To study the characteristics of Human settlements and the manifestation of settlements as expression of political aspirations.
- To understand the changing scenario in the context of globalization.

**CONTENT:**

**UNIT I IMPORTANCE OF EVOLUTION OF HUMAN SETTLEMENTS 9**

Origin of civilization, effects of civilization on Human settlements, determinants of Human settlements, ancient towns in India.

**UNIT II HISTORICAL PERIODS AND GROWTH OF HUMAN SETTLEMENTS 9**

Ancient, medieval, renaissance, industrial and post industrial age

**UNIT III HUMAN SETTLEMENTS AND THEIR CHARACTERISTICS 9**

Importance of shelter and its form and scale in city, concepts of land marks, axis and orientation, city as living commercial, cultural and functional entities.

**UNIT IV HUMAN SETTLEMENTS AS POLITICAL EXPRESSION 9**

Washington DC, Brasilia, Pretoria, Milton Keynes, New Delhi. Chandigarh, contributions of Ebenezer Howard, Lewis Mumford, Patrick Geddes, C.A. Doxiadis

**UNIT V HUMAN SETTLEMENTS IN A CHANGING WORLD 9**

Global city and city origin and Global economy and Trade, information and communication technology and its impact on cities, city of the future and future of cities, Sustainable cities.

**TOTAL: 45 PERIODS**

**REQUIRED READING:**

1. Kosambi D.D. (1920) , The Culture and Civilisation of ancient Indian historical outline, Vikas publishing Home Pvt. Ltd. Delhi.
2. Sjoberg G (1960) The Preindustrial city, the Force Press, new York.
3. Combaire J (1959) How cities Grew, The Florham Press, Madison, N.J.
4. Dickinson R.E. (1961) The West European City, Routledge and Kegan Paul Ltd., London
5. Sandhu R.S., Sustainable Human Settlements; Asian Experience, Rawat Publications, 2001.

**REFERENCES:**

1. Dutt B.B (1925) Town Planning in Ancient India, Thacker Spink & Co., Calcutta.
2. Mumford L (1961) The city in History, Harcourt, Brace, and World, New York
3. Combaire J (1959) How cities Grew, The Florham Press, Madison, N.J.

**AR8005****INTERIOR DESIGN****L T P/S C****3 0 0 3****AIM:**

The objective of the course is to create awareness and exposure to interior design as a discipline that is closely related to the field of architecture and supplementing it. It would offer a rudimentary knowledge and overview of the various aspects of interior design.

**OBJECTIVES:**

- To introduce the vocabulary of interior design.
- To familiarize the students with an overview of interior and furniture design and design movements through history.
- To inform the various components of interior space and treatment and finishes for the same.
- To familiarize the students with the various components of interior design like lighting, landscaping and furniture.

**CONTENT:****UNIT I INTRODUCTION TO INTERIOR DESIGN 8**

Definition and process of interior design - vocabulary of interior design in terms of principles and elements - introduction to the design of interior spaces as related to typology and function, themes and concepts

**UNIT II HISTORY OF INTERIOR AND FURNITURE DESIGN 8**

Overview of interior and furniture design in the Western context through the ages relating to historical context, design movements and ideas -overview of folk arts and crafts of India with reference to their role in interior decoration.

**UNIT III COMPONENTS OF INTERIOR SPACE- INTERIOR TREATMENT AND FINISHES 10**

Treatment of components such as floors, ceilings, walls, partitions, window treatments, accessories, etc., in terms of their choice and design related to materials, methods of construction, colour, texture, etc., based on functional, aesthetic and psychological criteria

**UNIT IV COMPONENTS OF INTERIOR SPACE- LIGHTING AND LANDSCAPING 10**

Interior lighting - different types of lighting - types of lighting fixtures- their effects and suitability in different contexts Interior landscaping elements: rocks, plants, water, flowers, fountains, paving, artifacts, etc., their physical properties and effects on spaces

**UNIT V COMPONENTS OF INTERIOR SPACE- - FURNITURE 9**

Furniture design as related to human comfort and function, materials and methods of construction, changing trends and lifestyles, innovations and design ideas - furniture for specific types of interiors: office furniture, children's furniture, residential furniture, display systems, etc.

**TOTAL: 45 PERIODS**

**REQUIRED READING:**

1. Francis D.K.Ching, Interior Design Illustrated, V.N.R. Pub. NY 1987
2. Joseph DeChiara, Julius Panero, Martin Zelnik, Time Saver's Standards for Interior Design, McGraw-Hill Professional 2001
3. John F.Pile, Interior Design, John Wiley and Sons 2004
4. Dr.Saranya Doshi, Editor, The Impulse to adorn - Studies in traditional Indian Architecture, Marg Publications 1982
5. Steport - De - Van Kness, Logan and Szebely, Introduction to Interior Design, Macmillan Publishing Co NY 1980.

**REFERENCES:**

1. Helen Marie Evans, An Invitation to design, Macmillan Pub Co 1982
2. Julius Penero and Martin Zelnik, Human Dimensions and Interior space, Whitney Library of Design NY 1979
3. Inca-Interior Design Register, Inca Publications, Chennai 1989
4. Kathryn B.Hiesinger and George H.Marcus, Landmarks of twentieth Century Design; Abbey Ville Press 1993
5. Susanne Slesin and Stafford Cliff, Indian Style, Clarkson N.Potter, Newyork 1990

**AR8006**

**STRUCTURE AND ARCHITECTURE**

**L T P/S C**

**3 0 0 3**

**AIM:**

This course is geared towards the integration of contemporary structural design in the form making process of architectural design. It will encourage the student to exercise judgement in areas of structure, form and process.



## **OBJECTIVES:**

- To study evolution of structural systems through history.
- To familiarise the students with concepts of structural design through works of architects/ engineers.
- To study architectural expression through relevant case studied.
- To evaluate the understanding of the relationship between form & structure through a seminar.

### **UNIT I HISTORY OF STRUCTURAL DESIGN IN THE PRE INDUSTRIAL ERA 8**

Development of monolithic and rock cut structures- trabeated construction-arcuate construction-vaults and flying buttresses- tents and masted structures and bridges through ancient and medieval history.

### **UNIT II HISTORY OF STRUCTURAL DESIGN IN THE POST INDUSTRIAL PERIOD 8**

Post Industrial modular construction of large span and suspension structures in steel and concrete- projects of Pier Luigi Nervi, Maillart, Candella, Buckminster Fuller and Eero Saarinen.

### **UNIT III CONTEMPORARY STRUCTURAL EXPRESSION THROUGH CASE STUDY – I 13**

The select case studies could include KCR Terminal at Hung Hom, Hong Kong, B3 Offices in Stockley Park , Sainsbury Centre for Visual Art, Renault Centre and Swindon UK by Norman Foster and Stansted Airport Terminal, London, UK by Foster/Arup British Pavilion EXPO 1992, Seville, Spain and Waterloo International Terminal by Nicholas Grimshaw

### **UNIT IV CONTEMPORARY STRUCTURAL EXPRESSION THROUGH CASE STUDY – II 10**

The select case studies could include Inmos Microchip Factory, Centre Commercial St. Herbtain, PA Technology, Princeton and Fleetguard, Quimper UK by Richard Rogers Athens Olympic Stadium and Village, Bridges and Public Bus Stop in St. Gallen , Railway Station, Lyon, France and Stadelhofen Railway station, Zurich Schweiz by Santiago Calatrava Kansai International Airport, UNESCO Workshop, the Jean-Marie Tjibaou Cultural Center, Menil Museum, Thomson Optronics Factory, IBM Traveling Exhibition Pavilion, Columbus International Exposition, Genoa Italy and Lowara Officers, Montecchio Maggiore Italia by Reno Piano Building Workshop

### **UNIT V SEMINAR 6**

Seminar to present a study of architectural form and structural expression through select

cases which will aid understanding of structural philosophy and analysis, building envelope and services and construction sequence.

**TOTAL: 45 PERIODS**

## **REFERENCES**

1. "Paper Arch" and Japan Pavilion at Expo 2000 in Hannover by Shigeru Ban
2. Greene King Draught Beer Dept and Schlumberger Cambridge Research Centre, UK by Michael Hopkins
3. Design Center, Linz, Austria and Two Family House in Pullach Thomas Herzog
4. King Abdul Aziz International Airport, Haj Terminal by SOM
5. Pavilion of the Future, Expo 92, Seville by Martorell, Bohigas & Mackay (MBM)
6. Daring Harbour Expo Center, Sydney Australia by P. COX
7. Olympic Archery Building by Enric Miralle & Carme Pinos
8. Eagle Rock House by Ian Ritchie
9. Le Grande Arche de La Defense by J O Spreckelsen

**AR8007**

**THEORY OF DESIGN**

**L T P/S C**

**3 0 0 3**

## **AIM**

The objective of the course is to provide an understanding of design as a discipline in order to enable self awareness and evolution in the students as designers.

## **OBJECTIVES:**

- To understand design and the role of the designer in changing society.
- To familiarize the students with methodologies, theories and models of the design process.
- To inform students about the term creativity and introduce techniques which will enable creative thinking.
- To inform the approaches that generate ideas for architectural design and the importance of the participatory approach to design.

## **CONTENT:**

### **UNIT I INTRODUCTION TO DESIGN**

**7**

Definition and understanding of design- design in history -changing role of designer on society- different classifications of design according to scale, process, mode of production,etc.,



4. Tom Heath - Method in Architecture, John Wiley & Sons, New York, 1984.
5. Nigel Cross - Developments in Design Methodology, John Wiley & Sons, 1984.
6. Evans, Helen Marie; Dumesnil, Carla Davis- An Invitation to Design, Macmillan Publishing Co., New York, 1982

**AR8008**

**VERNACULAR ARCHITECTURE**

**L T P/S C**

**3 0 0 3**

**AIM:**

To study everyday architecture in the traditional context built in various cultural and geographical regions of India with an emphasis on building types, use, materials, construction and building process.

**OBJECTIVES:**

- To introduce the study of vernacular architecture as a process and not a product.
- To provide an overview of the various approaches and concepts to the study of vernacular architecture.
- To study the various vernacular architecture forms in the various regions of the country.
- To look at the impact of Colonial rule on the vernacular architecture of India.

**CONTENT:**

**UNIT I INTRODUCTION 6**

Definition and classification of Vernacular architecture – Vernacular architecture as a process – Survey and study of vernacular architecture: methodology- Cultural and contextual responsiveness of vernacular architecture: an overview

**UNIT II APPROACHES AND CONCEPTS 9**

Different approaches and concepts to the study of vernacular architecture: an over view – Aesthetic, Architectural and anthropological studies in detail

**UNIT III VERNACULAR ARCHITECTURE OF THE WESTERN AND NORTHERN REGIONS OF INDIA 12**

Forms spatial planning, cultural aspects, symbolism, colour, art, materials of construction and construction technique of the vernacular architecture of the following:

- Deserts of Kutch and Rajasthan; Havelis of Rajasthan

- Rural and urban Gujarat; wooden mansions (havelis); Havelis of the Bohra Muslims
- Geographical regions of Kashmir; house boats

#### **UNIT IV VERNACULAR ARCHITECTURE OF SOUTH INDIA**

**8**

Forms, spatial planning, cultural aspects, symbolism, art, colour, materials of construction and construction technique, proportioning systems, religious beliefs and practices in the vernacular architecture of the following:

- Kerala: Houses of the Nair & Namboothri community; Koothambalam, Padmanabhapuram palace.
- Tamil Nadu: Houses and palaces of the Chettinad region; Agraharams.

#### **UNIT V WESTERN INFLUENCES ON VERNACULAR ARCHITECTURE OF INDIA**

**10**

Colonial influences on the Tradition Goan house - Evolution of the Bungalow from the traditional bangla, Victoria Villas – Planning principles and materials and methods of construction. Settlement pattern and house typologies in Pondicherry and Cochin.

**TOTAL: 45 PERIODS**

#### **REQUIRED READINGS:**

1. Paul Oliver, Encyclopedia of Vernacular Architecture of the World, Cambridge University Press, 1997.
2. Amos Rapoport, House, Form & Culture, Prentice Hall Inc. 1969.
3. R W Brunskill: Handbook on Vernacular Architecture

#### **REFERENCES:**

1. V.S. Pramar, Haveli – Wooden Houses and Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad, 1989.
2. Kulbushanshan Jain and Minakshi Jain – Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad 1992.
3. G.H.R. Tillotsum – The tradition of Indian Architecture Continuity, Controversy – Change since 1850, Oxford University Press, Delhi, 1989.
4. Carmen Kagal, VISTARA – The Architecture of India, Pub: The Festival of India, 1986.
5. S. Muthiah and others: The Chettiar Heritage; Chettiar Heritage 2000

**AIM:**

The aim of this course is design pre-stressed concrete beams and the estimation of the loss of pre-stressing.

**OBJECTIVES:**

- To study loss of pre-stress and design requirements for determinate beams.
- To study the design of flat slabs and High Rise structures.
- To study the concepts of tensile structures, grids, domes, shells and folded plates.

**CONTENT:**

<b>UNIT I</b>	<b>PRESTRESSED CONCRETE</b>	<b>10</b>
Losses of Prestress – Design requirements – Design of determinate beams.		
<b>UNIT II</b>	<b>FLAT SLABS</b>	<b>8</b>
Proportioning of flat slabs – Methods of analysis and design – Design of flat slabs – Shear in flat slab – Code provisions.		
<b>UNIT III</b>	<b>HIGH – RISE BUILDINGS</b>	<b>10</b>
Introduction – Load action in high rise buildings – Various structural systems – Approximate analysis and Design of frames for gravity and horizontal loadings.		
<b>UNIT IV</b>	<b>TENSILE STRUCTURES</b>	<b>10</b>
Concept, Development, Laws of formation, Merits and Demerits of Pneumatic structures – Basic principles, Various forms, Merits and Demerits of cable structures.		
<b>UNIT V</b>	<b>GRIDS, DOMES AND FOLDED PLATES</b>	<b>7</b>
Grids – Types of Grids – Domes – Geodesic domes – Shells and various forms – folded plates.		
		<b>TOTAL: 45 PERIODS</b>

**REQUIRED READING:**

1. B.C. Punmia, Reinforced Concrete Structures, Vol. 1 & 2, - Laxmi Publications, New Delhi, 1994.
2. N. Subramanian, Principles of Space Structures – Wheeler and Co., Allahabad, 1983
3. Thandavamoorthy T.S., Advanced Structures of Architecture, Eswar Press, 2008.

## REFERENCES :

1. P. Dayarathnam, prestressed concrete structures, Oxford and IBM publishing Co., New Delhi, 1982
2. Wolfgang Schueller – High Rise Building Structures, John Wiley & sons, New York 1976.
3. Frei Otto – Tensile structures Volume 1, Pneumatic structures, Volume 2, cable structures . The MIT press, London, 1967.
4. Tall Building structures – Analysis & Design – Bryan Stafford smith. John wiley, 1991.
5. Structural system for tall buildings – Council on tall buildings and urban habitat – Mc Graw Hill, 1995.
6. Pneumatic structures, Thomas Herzog – Crosby Lockwood staples, London, 1977.

**AR8010**

**ARCHITECTURAL CONSERVATION**

**L T P/S C**

**3 0 0 3**

### AIM:

This course is designed to address Conservation as an idea that enhances quality of life, as an effective planning strategy, a criticism of universal modernism and a way to address issues of memory and identity. An overview of current status of conservation in India is also provided.

### OBJECTIVES:

- To introduce the various issues and practices of Conservation.
- To familiarise the students with the status of conservation in India and the various agencies involved in the field of conservation worldwide and their policies.
- To outline the status of conservation practice in the country and the various guidelines for the preservation, conservation and restoration of buildings.
- To inform the students about the character and issues in our heritage towns through case studies.

### CONTENT:

#### **UNIT I INTRODUCTION TO CONSERVATION**

**9**

Understanding Heritage. Types of Heritage. Heritage conservation- Need, Debate and purpose. Defining Conservation, Preservation and Adaptive reuse. Distinction between Architectural and Urban Conservation. International agencies like ICCROM , UNESCO and their role in Conservation

**UNIT II CONSERVATION IN INDIA 9**

Museum conservation – monument conservation and the role of Archeological Survey of India – role of INTACH – Central and state government policies and legislations – inventories and projects- select case studies of sites such as Hampi, Golconda, Mahabalipuram -craft Issues of conservation

**UNIT III CONSERVATION PRACTICE 9**

Listing of monuments- documentation of historic structures- assessing architectural character – historic structure report- guidelines for preservation, rehabilitation and adaptive re-use of historic structures- Case studies of Palaces in Rajasthan, Chettinad and Swamimalai dwellings, seismic retrofit and disabled access/ services additions to historic buildings-heritage site management

**UNIT IV URBAN CONSERVATION 9**

Over view of urban history of India and Tamil Nadu- understanding the character and issues of historic cities – select case studies of towns like Srirangaram, Kumbakonam and Kanchipuram - historic districts and heritage precincts.

**UNIT V CONSERVATION PLANNING 9**

Conservation as a planning tool.- financial incentives and planning tools such as Transferable Development Right(TDR)-urban conservation and heritage tourism-case studies of sites like for Cochin, Pondichery French town.- conservation project management.

**TOTAL: 45 PERIODS**

**REQUIRED READING:**

1. Donald Appleyard, The Conservation of European Cities, M.I.T. Press,Massachusetts, 1979.
2. James M. Fitch, Historic Preservation: Curatorial Management of the Built World by University Press of Virginia; Reprint edition (April 1, 1990)
3. A Richer Heritage: Historic Preservation in the Twenty-First Century by Robert E. Stipe
4. Conservation Manual , Bernard Fielden; INTACH Publication

**REFERENCES:**

1. B.K. Singh, State and Culture, Oxford, New Delhi
2. A.G. K. Memon ed. Conservation of Immovable Sites, INTACH Publication, N.Delhi.
3. Seminar Issue on Urban Conservation.



**OBJECTIVES:**

To provide basic introduction to the skills relevant to the practice of professional journalism. It introduces students to the fundamentals of writing, explaining of various strategies and their criticism.

Introduction to Photojournalism and the contributions of photography to the professional practice of architecture and develop proficiency in this art using modern photography techniques.

**UNIT I INTRODUCTION****9**

Introduction to journalism, key concepts and objectives of Journalism – Specialized journalism: with emphasis on architectural journalism - Journalism skills: research, reporting, writing, editing, photography, columnists, public relationships, criticism.

Issues such as copyright, public art policy, the arts and urban redevelopment. Introduction to local culture scene.

**UNIT II TECHNOLOGIES IN JOURNALS****9**

Environment, Social Change, Persuasion- Interviewing techniques, Argument and debate as a technique in the investigation of social problems; evidence, proof, refutation, persuasion; training in argumentative speaking.

Introduction to software needed in journalism and photography, video coverage, walk-through of buildings, production of contemporary architectural journalism. Understanding the individual demands in the context of newspapers, radio, film, and television.

**UNIT II CONTEMPORARY ARCHITECTURAL JOURNALISM****9**

Role of the Editor - Editing of Articles, Features and other stories - Editing for online newspaper and magazines - Text preparation, Mode of presentation, Standards and Guidelines for documentation, Code of ethics, Basic knowledge on Press laws, Press Council of India, Multimedia/online journalism and digital developments.

**UNIT IV DISCUSSIONS AND ISSUES****9**

Regional, National and International discussion forums, Changes in contemporary and historical design practices. Discussions on topics needed in an architectural journal and current issues - types of journals, works of key architectural journalists, Public Discourse on the Internet, Mass Media and Public Opinion – critique on selected pieces of journalism.

## **UNIT V ARCHITECTURAL PHOTOGRAPHY**

**9**

Introduction to architectural photography and role of the photographic image in the global world – basic instruction in Photojournalism

Equipment: cameras and lenses – techniques: film speed, exposure measurement, gray scale – photo- finishing and editing digital images.

Perspectives: Single Point, Two- Point, Three- Point and methods of correcting distortions – Lighting: External and Interior

**TOTAL: 45 PERIODS**

### **TEXT BOOKS:**

1. Edward Jay Friedlander and John Lee (2000), Feature Writing for Newspapers and Magazines, 4th edition, Longman.
2. Fuller, David & Waugh, Patricia eds. (1999) The Arts and Sciences of Criticism, Oxford: Oxford University Pres
3. Foust, James, Online Journalism - Principles and Practices of News for the Web, (2005), Holcomb Hathaway Publishers, Scottsdale, AZ.
4. Professional Architectural Photography by M. Harris
5. Professional Interior Photography by M. Harris

### **REFERENCES:**

1. Huckerby, Martin. (2005) The Net for Journalists: A Practical Guide to the
2. Internet for Journalists in Developing Countries. UNESCO/Thomson Foundation/ Commonwealth Broadcasting Association.
3. Ward, S. J. A. "Philosophical Foundations of Global Journalism Ethics." Journal of Mass Media Ethics. 2005, Vol. 20, No. 1, 3-21
4. Basics Architectural photography – Heinrich
5. Architectural Photography: the professional way by Gerry Kopelow, 2007

**AR8012**

**CONSTRUCTION AND PROJECT MANAGEMENT**

**L T P/S C**

**3 0 0 3**

### **AIM:**

The modern constructional projects are becoming increasingly complex in nature owing to the involvement of specialized trades and agencies. These projects concern a multitude of activities at every level of planning, design and execution. In such a project, the project of

coordinating those activities becomes a problem. This makes a proper management system necessary for accomplishing the task efficiently in terms of both time and cost. The recent developments in management science have opened up new ways to architects, civil engineers and those associated with construction and planning jobs for solving the problems efficiently. The purpose of this course is to discuss different management techniques suitable for planning and constructional projects.

## **CONTENT:**

### **UNIT I INTRODUCTION TO PROJECT MANAGEMENT 4**

Project management concepts-objectives, planning, scheduling Controlling and role of decision in project management. Traditional management system, Gantt's approach, Load chart. Progress Chart, Development of bar chat, Merits and Demerits.

### **UNIT II PROJECT PROGRAMMING AND CRITICAL PATH METHOD 15**

Project Network-Events Activity, Dummy, Network Rules, Graphical Guidelines for Network, Umbering the events, Cycles, Development of Network-planning for Network Construction, Models of Network construction, steps in development of Network. Work Break Down Structure, hierarchies. Concepts: critical path method-process, activity time estimate, Earliest Event time, Lastest allowable Occurrence time, start and finish time of activity, float, critical activity and critical path-problems.

### **UNIT III ANALYSIS 6**

Cost model-Project cost, direct cost, indirect cost, slope curve, Total project cost, optimum duration contracting the network for cost optimization. Steps in cost optimization, updating, resource allocation-resource smoothing, resource leveling.

### **UNIT IV PROGRAMMING EVALUATION REVIEW TECHNIQUE 10**

PERT network, introduction to the theory of probability and statistics. Probabilistic time estimation for the activities for the activities of PERT Network.

### **UNIT V COMPUTERIZED PROJECT MANAGEMENT 10**

Introduction: Creating a New project, building task. Creating resources and assising costs, Refining your project. Project Tracking-Understanding tracking, recording actual. Reporting on progress. Analyzing financial progress.

**TOTAL: 45 PERIODS**

## **REQUIRED READING:**

1. Dr. B.C. Punmia and K.K. Khandelwal-Project planning and control with PERT/CPM, Laxmi publications, New Delhi, 1987.



**UNIT III CONSTRUCTION METHODS AND EQUIPMENT 10**

Uses of the following: Tractors, bulldozers, shovels draglins, cableways and belt conveyors, batching plants - Transit mixers and agitator trucks used for ready mix concrete pumps Guniting equipments - Air compressors - welding equipment - cranes and other lifting devices Choice of construction equipment for different types of works.

**UNIT IV CONSTRUCTION TECHNOLOGY FOR HIGHRISE BUILDINGS 6**

Planning and scheduling for high rise building: Scheduling- Simulation – Typical Floor Construction Cycle – Appropriate working schedule.

**UNIT V CONSTRUCTION MANAGEMENT 9**

Overview of construction management topics including estimating, cost control, quality control, safety, productivity, value engineering, claims, and legal issues.

**TOTAL : 45 PERIODS**

**REQUIRED READINGS:**

1. R. Chudley, Construction Technology, Pearson, 2005.
2. R. Barry, The Construction of Buildings, The English Language Book Society and Crosby Lockwood, Staples, London, 1976.
3. Construction Planning equipment and Methods by RL Peuriboy Tata McGraw Hill, 1979
4. Modern Construction and Management. Frank Harris John Wiley and Sons, 1983.

**REFERENCES:**

1. National Building Code of India, 2005
2. Frank R. Dagostino, Materials of Construction – Details given Reston Publishing Company, nc.Virginia, 1976.
3. M. Mohsin, Project Planning and Control, Vikas Publishers, New Delhi, 1983
4. Concrete Technology – Theory and Practice, M.S. Shetty, Chand & Co, New Delhi, 2005.
5. Building, Planning, Designing and Scheduling – Gurcharan Singh.

**AR8014 CONTEMPORARY PROCESSES IN ARCHITECTURE L T P/S C  
3 0 0 3**

**AIM:**

This course is designed to understand the relation between digital technology, media and architecture. It is also looks at how technology enables critical engagement with architecture

and is addressed through theories and practices proposed by contemporary architects.

**OBJECTIVES:**

- To investigate various theories of media and its influence on the perception of space.
- To study the various aspects of Digital Architecture and its exploration through emerging phenomena that relies on abstraction of ideas.
- To study the works of contemporary architects who have illustrated the influence of the digital media in evolving architecture. This is to be presented as Seminars.

**CONTENT:**

**UNIT I INTRODUCTION 6**

Investigation of contemporary theories of media and their influence on the perception of space and architecture. Technology and Art – Technology and Architecture – Technology as Rhetoric – Digital Technology and Architecture

**UNIT II ASPECT OF DIGITAL ARCHITECTURE 9**

Aspects of Digital Architecture – Design and Computation – Difference between Digital Process and Non-Digital Process – Architecture and Cyber Space – Qualities of the new space – Issues of Aesthetics and Authorship of Design – Increased Automatism and its influence

**UNIT III CONTEMPORARY PROCESS 10**

Emerging phenomena such as increasing formal and functional abstractions – Diagrams – Diagrammatic Reasoning – Diagrams and Design Process – Animation and Design – Digital Hybrid

**UNIT IV GEOMETRIES AND SURFACES 10**

Fractal Geometry – Shape Grammar - Hyper Surface - Liquid Architecture – Responsive Architecture.

**UNIT V SEMINAR 10**

Students would make presentation on the ideas and works of the following architects. The proposal must be discussed with course faculty prior to presentation. Greg Lynn, Reiser + Umemotto, Lars Spuybroek / NOX Architects, UN studio, Diller Scofidio, Dominique Perrault, Decoi, Marcos Novak, Foreign Office Architects, Asymptote, Herzog and de Meuron, Neil Denari.

**TOTAL: 45 PERIODS**

## **REQUIRED READING**

1. Walter Benjamin, Practices of Art in the Age of Mechanical Reproduction, in
2. Illumination, Colin press, 1977
3. Ignasi de Sola Morales, High Tech: Functionalism of Rhetoric
4. Work of Architecture in the Age of Mechanical Reproduction, Differences MIT press, 1997.
5. Peter Eisenmann, Vision Unfolding, Architecture in the Age of Electronic Media.
6. William J Mitchell, the Logic of Architecture: Design, Computation and Cognition. MIT Press, Cambridge, 1995
7. Ali Rahim, Contemporary Process in Architecture, John Wiley & Sons, 2000
8. Contemporary Techniques in Architecture, Halsted Press, 2002
9. Peter Eisenmann, Diagram: An Original Scene of Writing, Diagram Diaries
10. Grey Lynn, The Folded, The Pliant and The Supple, Animate form

## **REFERENCES:**

1. Gillian Hunt, Architecture in the Cybernetic Age, Architectural Design Profile no. 136
2. Sarah Chaplin, Cyber Space Linger on the Threshold, Architecture, postmodernism and difference, Architectural Design Profile 118
3. L. Convey et. al. Virtual Architecture, Batsford, 1995.
4. Rob Shields (ed.) Cultures of the internet: Virtual Spaces, Real Histories, Living bodies, Sage, London
5. John Beckman, The Virtual Dimension, Architecture, Representation and Crash Culture, Princeton Architecture Press, 1998.
6. William J Mitchell, City of bits: Space, Place and the Infobahn. MIT Press, Cambridge, 1995
7. Marcos Novak, invisible Architecture: An Installation for the Greek Pavilion, Venice Biennale, 2000

**AR8015**

**LANDSCAPE AND ECOLOGY**

**L T P/S C**

**3 0 0 3**

## **AIM:**

To familiarize students with landscape architecture as a discipline and the many facets it entails.

## **OBJECTIVES:**

- To familiarize students with the various elements of landscape architecture and the principle of landscape design.
- To provide an overview of ecological balance and impacts of human activities and stress the need for environmental protection and landscape conservation.
- To develop and strengthen the competence in dealing with the analytic, artistic and technical aspects of designing open spaces at different scales.

## **CONTENT:**

### **UNIT I INTRODUCTION 7**

Introduction to landscape architecture, ecology, ecological balance, landscape conservation, reclamation and landscaping of derelict lands, environmental impact assessment.

### **UNIT II ELEMENTS IN LANDSCAPE DESIGN 10**

Hard and soft landscape elements; Plant materials - classification, characteristics, use and application in landscape design; Water and Landform,

### **UNIT III GARDEN DESIGN 10**

Landscape and garden design in history - Japanese, Italian Renaissance and Moghul gardens in India, Study of notable examples, Spatial development in landscape design.

### **UNIT IV SITE PLANNING 10**

Organisation of spaces - circulation, built form and open spaces, site planning and micro climate, site planning for neighbourhood parks, children's play area and campus development.

### **UNIT V LANDSCAPING OF FUNCTIONAL AREAS 8**

Urban open spaces and principle of urban landscape; Street landscaping, landscape design for waterfront areas and functional areas in urban centers; green roofs and walls.

**TOTAL: 45 PERIODS**

## **REQUIRED READING:**

1. Michael Laurie, An Introduction to Landscape Architecture, Elsevier, 1986.
2. Geoffrey And Susan Jellicoe, The Landscape of Man, Thames And Hudson, 1987.

## **REFERENCES:**

1. T S S for Landscape Architecture, Mc Graw Hill, Inc, 1995



2. Grant W Reid, From Concept to Form in Landscape Design, Van Nostrand Reinhold Company , 1993.
3. Brian Hacket, Planting Design, Mc Graw Hill, Inc, 1976
4. Handbook of urban landscape, Cliff Tandy, Architectural press, 1973
5. T.K. Bose and Chowdhury, Tropical Garden Plants in Colour, Horticulture And Allied Publishers, Calcutta, 1991.

**AR8016**

**SUSTAINBLE PLANNING AND ARCHITECTURE**

**L T P/S C**

**3 0 0 3**

**AIM:**

To provide an overview of the concepts of sustainable practices in planning the built environment.

**OBJECTIVES:**

- To understand the concept of sustainability and sustainable development
- To inform the various issues like climate change, ecological footprint, etc.
- To understand low impact construction practices, life cycle costs and alternative energy resources.
- To familiarize the students with the various rating systems for building practices with case studies.
- Through case studies to understand the concept of sustainable communities and the economic and social dimensions.

**UNIT I**

**7**

Concept of Sustainability – Carrying capacity, sustainable development – Bruntland report – Ethics and Visions of sustainability.

**UNIT II**

**8**

Eco system and food chain, natural cycles – Ecological foot print – Climate change and Sustainability.

**UNIT III**

**10**

Selection of materials Eco building materials and construction – Biomimicry, Low impact construction, and recyclable products and embodied energy. Life cycle analysis. Energy sources – Renewable and non-renewable energy.

**UNIT IV****10**

Green building design – Rating system –LEED, GRIHA, BREEAM etc., case Studies.

**UNIT V****10**

Urban ecology, social and economic dimensions of sustainability, urban heat Island effects, sustainable communities – Case studies.

**TOTAL: 45 PERIODS****REFERENCES:**

1. Sustainable Architecture and Urbanism: Concepts, Technologies and examples by Gauzin- Muller(D) – Birkhauser 2002.
2. Eco-Tech : Sustainable Architecture and High Technology by Slessor© - Thames and Hudson 1997.
3. Ecodesign : A manual for Ecological Design by Yeang(K) – Wiley Academy 2006.

**REQUIRED READINGS:**

1. Sustainable Architecture : Low tech houses by Mostaedi (A) – Carles Broto 2002.
2. HOK guide book to sustainable design by Mendler (S) & Odell (W) – John willey and sons 2000.
3. Environmental brief : Path ways for green design by Hyder(R) – Taylor and Francis 2007.
4. Green Architecture: Design for a sustainable future by Brenda and Vale (R) – Thames and Hudson 1996.

**AR8017****URBAN HOUSING****L T P/S C****3 0 0 3****AIM:**

The course is designed to inform about the process of housing in the context of the scarcity housing resources in India.

**OBJECTIVES:**

- To outline the Issues concerning housing in the Indian Context and the various agencies involved in the production of housing.
- To outline factors that influence housing affordability and to familiarize students with various schemes and policies of the government in the housing sector.

- To inform about the standards and guidelines for housing
- To inform about the various housing design typologies and the processes involved in housing project development.

**CONTENT:**

**UNIT I INTRODUCTION TO HOUSING AND HOUSING ISSUES – INDIAN CONTEXT 10**

Housing and its importance in Architecture and its relationship with neighbourhood and city planning.

Housing demand and supply – National Housing Policy – Housing agencies and their role in housing development – impact of traditional life style – Rural Housing, Public, private sector housing.

**UNIT II SOCIO-ECONOMIC ASPECTS 10**

Social economic factors influencing housing affordability – equity in housing development sites and services/-slum upgradation community participation – Indira Awas Yojana Crime prevention, Health principles in Housing.

**UNIT III HOUSING STANDARDS 7**

UD PFI – guide lines, standard and regulations – DCR – performance standards for housing.

**UNIT IV SITE PLANNING AND HOUSING DESIGN 10**

Site Planning : Selection of site for housing, consideration of physical characteristics of site, locational factors, orientation, climate, topography – Landscaping- Housing design - Traditional housing, row housing, cluster housing – apartments and highrise housing relating to Indian situations – case studies in India – integration all types of services, parking, incorporation of green sustainable practices –prefabrication in housing.

**UNIT V HOUSING PROCESS 8**

Various stages and tasks in project development –community participation and housing management – Environmental aspects and national calamities and disaster mitigation.

**TOTAL: 45 PERIODS**

**REFERENCES:**

1. Christopher Alexander, A pattern Language, Oxford University press, New York 1977
2. Leuris (S), Front to back: A Design Agenda for Urban Housing, Architectural Press, 2006.

**REQUIRED READINGS:**

1. Richard Kintermann and Robert small site planning for cluster Housing Van Nastrand Reinhold company, Jondon/New York 1977.
2. Joseph de Chiara and others – Time Saver Standards for Housing and Residential development, McGraw Hill Co, New York 1995.
3. Forbes Davidson and Geoff Payne, Urban projects Manual. Liverpool University press, Liverpool 1983.
4. HUDCO publications – Housing for low income, sector model.